VOLUME XIII APRIL 1920 NUMBER 4

Southern Medical Journal

Journal of The Southern Medical Association

Published monthly at Birmingham, Alabama. Subscription $3.00 the year. Entered as Second-Class Matter at the Postoffice at Birmingham, Alabama, under Act of March 3, 1879.

TABLE OF CONTENTS

MEDICINE—Internal Diseases, Pediatrics, Neurology, Diagnostic Methods, Etc.

Is Sprue Endemic in the South? Mark F. Boyd, Galveston, Tex. 229

Indicanuria (Toxic States) Symptoms, Diagnosis and Treatment. W. A. Dearman, Long Beach, Miss. 232

Discussed by Allan Eustis, New Orleans, La.; Arthur A. Herold, Shreveport, La.

Cardiospasm, with Report of One Hundred Cases. J. Russell Verbrycke, Jr., Washington, D. C. 236

Discussed by R. W. Mills, St. Louis, Mo.; Douglas VanderHoof, Richmond, Va.; George M. Niles, Atlanta, Ga.; J. C. Bradley, Washington, D. C.; A. L. Gray, Richmond, Va.; Julius Friedenwald, Baltimore, Md.

Coccidioidal Granuloma, Including the First Reported Case East of the Mississippi. Kenneth M. Lynch, Charleston, S. C. 245

Discussed by J. Heyward Gibbes, Columbia, S. C.

TROPICAL DISEASES AND PUBLIC HEALTH

Studies on Malaria Control. XI. Control of Malaria by Quinine Sterilization of the Human Host. C. C. Bass, New Orleans, La. 250

Discussed by Graham E. Henson, Jacksonville, Fla.; William Krauss, Memphis, Tenn.; H. R. Carter, Baltimore, Md.; J. C. Geiger, Washington, D. C.

Results of Recent Efforts to Control Malaria. John A. Ferrell, New York, N. Y. 256

Discussed by Graham E. Henson, Jacksonville, Fla.; Chas. E. Lowe, Wilmington, N. C.; H. R. Carter, Baltimore, Md.; C. C. Bass, New Orleans, La.

Malaria Control in Rural Communities by Anti-Mosquito Measures. H. H. Howard, New York, N. Y. 260

Discussed by H. W. Van Hovenberg, Texarkana, Ark.; J. A. LePrince, Memphis, Tenn.

Concluded on next page

Something New

Principles and Practice of

ROENTGENOLOGICAL TECHNIQUE

By I. SETH HIRSCH, M.D.
Director, X-Ray Department, Bellevue and Allied Hospitals

This book contains many items overlooked in other text-books and does not omit the IMPORTANT factors in Roentgen practice. Such things as Christen's half-value absorption theory is fully described, and the page upon the Focal Point Tests for tubes is extremely valuable in the practical classification of tubes which are in daily use.—In short, it is a modern work on Roentgenological Technique and should not be overlooked by those interested in Roentgenology.

342 illustrations and 22 tables. Price $10.00, postpaid

J. A. MAJORS COMPANY

NEW ORLEANS, LA. DALLAS, TEXAS

Chicago Laboratory, 25 East Washington Street, Chicago, Illinois, see page 47

TABLE OF CONTENTS—Concluded

SURGERY—Railway, Industrial, Gynecological, Obstetrical and Urological

Surgical Researches During the World War. George W. Crile, Cleveland, Ohio 267

Unraveling the Mysteries of Right-Sided Abdominal Pain in the Female. J. N. Baker, Montgomery, Ala. 271

Inguinal Hernia of the Uterus. Hubert A. Royster, Raleigh, N. C. 275

Discussed by E. H. Richardson, Baltimore, Md.; F. Webb Griffith, Asheville, N. C.; John Wesley Long, Greensboro, N. C.; Marcus Skinner, Selma, Ala.; W. W. Harper, Selma, Ala.

The Management of Tumors of the Urinary Bladder. Edgar G. Ballenger and Omar F. Elder, Atlanta, Ga. 279

Discussed by John R. Caulk, St. Louis, Mo.; G. Timberlake, Baltimore, Md.; Bransford Lewis, St. Louis, Mo.; A. J. Crowell, Charlotte, N. C.; John T. Geraghty, Baltimore, Md.

EYE, EAR, NOSE AND THROAT

An Orbito-Palatal Route of Transilluminating the Maxillary Sinus. H. H. Briggs, Asheville, N. C. 284

Discussed by R. C. Lynch, New Orleans, La.; J. A. Stucky, Lexington, Ky.; W. L. Simpson, Memphis, Tenn.; R. H. Cowley, Berea, Ky.; E. H. Cary, Dallas, Tex.; G. M. Maxwell, Roanoke, Va.; J. Brown Farrior, Tampa, Fla.; Eldred B. Cayce, Nashville, Tenn.; E. G. Gill, Roanoke, Va.

The Maxillary Sinus in the Role of a Reservoir for Overlying Sinus Disease. Homer Dupuy, New Orleans, La. 287

The Maxillary Sinus. John T. Crebbin, New Orleans, La. 290

X-Ray Aid in the Diagnosis of Nasal Accessory Sinus Disease. J. W. Jervey, Greenville, S. C. 291

Symposium on the Maxillary Sinus, papers of Drs. Dupuy, Crebbin and Jervey, discussed by H. H. Briggs, Asheville, N. C.; G. M. Maxwell, Roanoke, Va.; Robert C. Lynch, New Orleans, La.; J. A. Stucky, Lexington, Ky.; J. J. Shea, Memphis, Tenn.

EDITORIALS 296

A Standard Method of Treating Malaria
Surgeon-General Cumming
Prospects for a National Department of Health
Calories and Vitamins
Oyster and Shellfish Infections
Indigent Tuberculous Patients Are Best Treated at Home

CORRESPONDENCE 303

BOOK REVIEWS 304

SOUTHERN MEDICAL NEWS 304

New (8th) Edition

FLINT'S PHYSICAL DIAGNOSIS

New (8th) Edition

In every corner of the globe, wherever there is a medical man, this little work is known for its simplicity, directness, exactness and authority in dealing with physical signs in health and disease. The priniciples, methods, limitations and the practical conclusions of physical examination of the thoracic viscera have never been more clearly nor more effectively described in English.

In this new edition are included the more recent studies upon Effort Syndrome or Soldier's Heart, which have added so much to our knowledge of cardiac disorders and arrhythmias. Greater emphysis has been laid upon the unsual signs that may occasionally be found over the normal heart which led in the past two years to many erroneous diagnoses of organic valvular disease. More attention is given to Pericarditis while Bronchopneumonia, particularly the confluent forms which complicated the Influenzal Epidemic, has been brought into greater prominence—also the diagnosis of Pulmonary Tuberculosis on uncertain and insufficient evidence—a cause of countless errors both in the French Army and in our own—has been most carefully considered.

CONTENTS

The Physical Basis of Auscultation and Percussion of the Lungs—Anatomical, Physiological and Pathological Principles Involved in Percussion and Auscultation—Percussion in Health—Percussion in Disease—Auscultation in Health—Auscultation in Disease—The Physical Diagnosis of Diseases of the Respiratory Organs—The Physical Conditions of the Heart in Health and Disease. The Heart Sounds and Cardiac Murmurs—The Physical Diagnosis of Diseases of the Heart and of Thoracic Aneurism—Examination of the Abdomen—Order of Physical Examination.

By AUSTIN FLINT, M.D., Late Professor of the Principles and Practice of Medicine, Bellevue Hospital Medical College. Revised by HENRY C. THACHER, M.D., College of Physicians and Surgeons. Assistant Attending Physician, Roosevelt and Lincoln Hospitals, New York. 12 mo. 362 pages, illustrated.

Cloth, $3.00 net.

PHILADELPHIA
706-10 Sansom St.

Lea & Febiger

NEW YORK
2 W. 45th St.

SOMETHING NEW IN MEDICAL BOOKS

Medicine — Surgery — The Specialties
All the Basic Studies Comprehensively and Completely Covered in Three Volumes—

Here is a new work that will prove a boon to the busy doctor who has neither the time nor the desire to wade through the exhaustive volumes which comprise the basic studies. "Medicine and the Allied Sciences," by Dr. Samuel Fomon, is a concise, logical presentation of medical facts. By means of analytical outlines, with all repetition eliminated, it presents the most convenient and simple means for study or review ever announced to the medical profession. It provides a method whereby one may not only pursue one given subject, but also see the relation of that subject to the balance of medicine. It correlates the facts in any division of study and coordinates it with the whole of medicine and surgery.

THE FOMON METHOD

General Outline 95% *Description* + **Individual Peculiarities** *The Other* 5% *Distinctive Description* = **Complete Description** 100%

Dr. Samuel Fomon has been teaching medicine for many years. His business is teaching and he has given all his time to the thought of how to make the study of medicine simpler, more direct, more practical, less confusing. Out of years of labor he has perfected a system by which the entire domain of medicine is reduced to a comparatively few pages. He cuts out all needless repetition, all rhetorical effects, all non-essentials. He gives in one general outline the average description peculiar to all divisions of a subject. You learn this once and then all you have to learn are the *variations*. Thus by means of his new work the busy doctor may review, *with surprisingly little time and effort*, any subject upon which he feels the need to "brush up." By Dr. Fomon's method practically everything in the domain of medicine—every known fact or accepted theory applied to every known disease—is covered in three volumes.

Dr. Fomon's work not only provides a concise and complete presentation of the facts in each department of medical science, but it likewise provides a system whereby the teachings in each department may be instantly applied to the case in hand.

IT COVERS THE ENTIRE FIELD
Not by Abridgement but by Systemization

Anatomy	**is complete in**	**250**	**pages**
Physiology	" "	**65**	**pages**
Pathology	" "	**55**	**pages**
Bacteriology	" "	**25**	**pages**
Surgery	" "	**200**	**pages**
Materia Medica	" "	**88**	**pages**
Obstetrics	" "	**75**	**pages**
Gynecology	" "	**70**	**pages**
Dermatology	" "	**15**	**pages**
Hygiene	" "	**35**	**pages**

Etc., etc., etc.

In three volumes, illustrated with desk index and key. Price **$25.00** *per set.*

This is an Appleton Book

D. APPLETON AND COMPANY

Publishers **35 W. 32d Street, NEW YORK**

ORDER FORM

D. APPLETON & COMPANY
35 West 32d Street, New York.

Please send me, prepaid, Fomon's "Medicine and the Allied Sciences," three volumes, cloth binding (with desk index), price $25.00 per set. I enclose check for $4.00 and agree to pay the balance in monthly installments of $4.00 until paid in full. (Or charge to my account.) Six per cent. discount allowed if full cash accompanies order.

Name .....

Address .....

City .....

S.M.J. 4-20

THE LATEST BOOKS

DENNETT

Here is a book on Simplified Infant Feeding written to help the general practitioner to successfully feed his babies as they occur in his practice, and its usefulness is well known.

In this second edition eighty illustrative cases are given and tell in detail just how to feed an infant.

The book is brought up-to-date and all the newer things that have proved useful to the author are included, with new matter on Dry Milk, Acidosis, Salts of Milk, and the Hypertonic Infant. The chapters on Diarrhoea have been extensively revised.

The illustrations are as practical and satisfying as the text. Second Edition.

ROGER H. DENNETT
N. Y. Post-Graduate Medical School, N. Y.

400 Pages. 14 Illustrations. $5.00

HIRST

In this Atlas of Gynecological Operations each step of each operation is shown by large colored drawings and gives the technic in the most concise language possible.

BARTON COOKE HIRST
University of Pennsylvania

292 folio pages, 164 plates, 46 figures. $7.00

FLAGG

The Art of Anaesthesia and every variety and phase of its practice is fully covered in this monograph. Second Edition.

PALUEL J. FLAGG
College of Physicians and Surgeons, N. Y.

367 Pages. 136 Illustrations. $4.50

HARTZELL

This treatise on Dermatology is a practical guide for the general practitioner in diagnosis and treatment.

Most profusely illustrated with colored photographs from nature with an accuracy hitherto unattainable.

In the sections on Treatment all the methods which have proved successful are included. Second Edition.

MILTON B. HARTZELL
University of Pennsylvania

807 pages, 51 plates, 247 text cuts. $7.00

SKILLERN

A complete work on the Accessory Sinuses of the Nose, now in its Third Edition.

After treatment of sinuses upon which an operation has been performed, new treatments on surgical procedures learned in the War, the treatment of sinus disease in children, the use of the naso-pharyngoscope, the diagnostic needle puncture are fully explained, with the dangers and how to avoid them. Considerable attention has been given to that phase of the treatment which deals with the judgment of the attending surgeon as to what procedures shall be followed under different circumstances.

In the matter of illustrations it is not only most thorough and lucid, but in case of operative work, successive steps are so clearly shown that there can be no misunderstanding as to how the work is to be done.

It has always been called "the only complete work on the sinuses."

ROSS HALL SKILLERN
University of Pennsylvania

414 Pages. 257 Illustrations. $6.00

J. B. LIPPINCOTT COMPANY
PHILADELPHIA since 1792
EAST WASHINGTON SQUARE

LONDON since 1875 MONTREAL since 1897
16 John St., Adelphia, W.C.2 Unity Building

Why

Tice's Practice of Medicine

is always up to date

FIRST, because of its perfected, simply constructed loose-leaf binding, which permits of the insertion of new pages containing the latest clinically proven advances in medicine and of the removal of out-of-date pages. TICE'S PRACTICE OF MEDICINE is not only right up to date at the time you buy it, but it is kept perpetually so—always in tune with the newest and best in current medical thought. Its adjustable paging makes it impossible for this work to ever become antiquated.

Periodically new pages containing the new things in medicine and the additions necessary to bring the various articles up to date will be sent to our subscribers with instructions for removing the out-of-date pages and substituting the new ones. Ten years from now 50 per cent. of the original pages in the volumes you buy today may have been replaced by new ones.

SECOND, because of its 100-page monthly abstract supplement containing concise digests of the best articles in the current medical literature of the world. 150 journals in all languages are covered by this service. Every month we will send out to our subscribers, with a craft-leather binder furnished once a year, 100 pages containing some original articles and abstracts of all the best articles from the current medical periodicals in internal medicine, in all languages. Every year the subscriber to "Tice's Practice of Medicine" acquires a new volume of live current information. At the same time his original ten volumes are being kept up to date.

A clinical arrangement of information that appeals to every practitioner

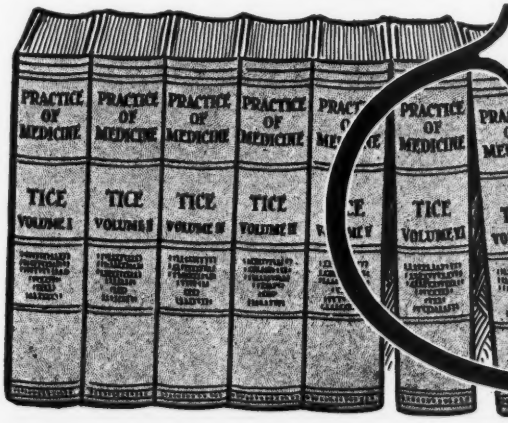
Every article in this Practice reads as if your patient were sitting before you. Diagnosis and treatment—the two things a practitioner uses a work of this kind for most—are given in the greatest detail and in the most easily accessible form for every disease. All material that is essential, yet not immediately useful, is relegated to the last part of each article. You do not have to turn over 30 or 40 pages to get at the information you are most apt to need. In nine cases out of ten the physician is the busiest man in the community. The saving of his time is of first importance. He is a great user of books. We are making time-saving books for him like those made for men of other businesses and professions.

Service

Team-work — co-operation between the men who make books and the physicians who use them is the idea behind the success of this new Practice of Medicine.

We are not merely selling books; we are giving our subscribers service—service which began with the thought for the doctor's convenience in the planning of TICE'S PRACTICE OF MEDICINE and service which will continue during the lives of its subscribers.

In addition to the important fact that these books are being kept constantly up to date by the publication of new pages containing new material to be inserted in the volumes and that a supplement is furnished once a month containing concise abstracts from the current medical periodicals in all languages, a free research and bibliographic service is maintained for the use of the subscribers to TICE'S PRACTICE OF MEDICINE.



10 VOLUMES ... ALWAYS UP TO DATE
Send for complete descriptive circular.

W. F. PRIOR COMPANY, Inc.
22 East 17th Street, New York

CLIP AND MAIL TODAY

Send me, today, free of charge, your large 8-page descriptive circular of

"TICE'S PRACTICE OF MEDICINE"

Name.....

Address.....

Consider These Facts

DOCTORS who have investigated the action, properties and residues of various leavening agents, recommend

Calumet Baking Powder

It is used in their own homes. Such ingredients as are used in the manufacture of CALUMET have been approved by the Remsen Board of consulting scientific experts, appointed by the United States Government and composed of men whose ability is acknowledged and whose conclusions are accepted.

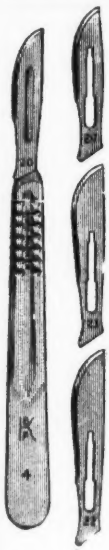
CALUMET is a Phosphate Powder in which enough of the acid phosphate has been replaced with Sodium Alum (not drug store alum) to insure its keeping qualities and give the proper speed of action. It is chemically correct.

It is manufactured in the largest, finest and most sanitary baking powder plant in the world. The ingredients used in the manufacture of CALUMET are tested for purity and strength before being compounded and the finished product is given laboratory tests and baking tests. The powder is not touched by human hands at any point in the process of manufacture.

CALUMET is the favorite baking powder in millions of American homes. It is used by domestic science teachers and expert chefs. It has been used for years in hotels, restaurants, bakeries and public institutions. It is the ideal baking powder for hospitals, sanitariums, etc. Special terms for such institutions mailed on request.

Calumet Baking Powder Company

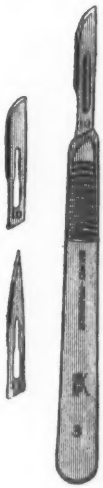
CHICAGO, ILLINOIS



No. 4 Handle Fits No. 20, 21 and 22 Blades

STANDARDIZED SHARPNESS
BP
For the Surgeon
BARD-PARKER KNIFE

It's
Sharp!



No. 3 Handle Fits Nos. 10 and 11 Blades

This knife is designed to eliminate the nuisance and uncertainty of resharpening by means of renewable blades, which have the sharpest cutting edge attainable.
A used blade can be instantly changed for a new one with a keen edge, at less than the cost of resharpening an ordinary scalpel. The surgeon is thus assured of a knife of standard sharpness always ready for use.

Blades in packages containing 6 of one size. Order by size number

Handles, all sizes, each	$1.00
Blades, all sizes, per dozen	1.50
Cases, Leather, for 6 to 30 blades, 1 to 2 handles	1.25

Ask Your Dealer

BARD-PARKER CO., Inc., 37 East 28th Street, NEW YORK CITY

The Last Word on Phallic Worship and Symbolism

Sex and Sex Worship

A Scientific Treatise on Sex, Its Nature and Function, and Its Influence on Art, Science, Literature and Religion—with Special Reference to Sex Worship and Symbolism.

By O. A. Wall, M.D., Ph.G., Ph.M.

625 pages, 6¾x9¾, with 375 beautiful illustrations from one of the largest collections in the world on the subject. Beautifully printed on special sepia paper and bound in blue silk cloth with gold stamping on front cover and backbone. Price, postpaid..... $8.00

An Entirely Different Book

Professor Wall has written the first book that treats of pallic worship in connection with the evolution of the human body and mind. He has been an ardent student of the subject for more than a third of a century and only recently consented to the publication of his material. He explains the nature of sex and the ideas associated with it from primitive times to the present day; its influence in developing religions, arts, architecture, literature, science and social relationships. The whole study is profusely illustrated with examples of ancient, medieval and modern art and ornamentation.

This book is a work of art—a masterpiece in book-making. It is different from anything heretofore published. You are certain to be pleased with it. Send for a copy today, using the attached coupon.

THE C. V. MOSBY COMPANY
MEDICAL PUBLISHERS
801-809 Metropolitan Building, ST, LOUIS, U. S. A.
(Ask for a copy of our new 88-page catalog of medical books)

Some of the Subjects Covered

Sex—Modern Religions—Other Beliefs—How Old Is Mankind?—Nature of Sex—Nature of Reproduction—Status of Woman—Cosmogonies—Gemetria—Sex in Plants and Totemism—In Animals and Mankind—Light on a Dark Subject—Social Relations of Men and Women—Gratification of the Senses—Art and Ethics—Sculpture—Art Anatomy—Credulity—Lycanthropy—Primitive Beliefs—Sexual Relationships of the Gods—Monogamy, Polygamy—Phallic Worship—Plant Worship—Animal Worship—Some Gods—Eternal Feminine—Virgin Worship—About Goddesses—Sexual Union Among Deities—Serpent Worship—Worship of Heavenly Bodies—Phallic Festivals—Water—Is There an Immortal Soul?

C. V. Mosby Co., (Southern Med.)
St. Louis, Mo.

Send me a copy of Wall's "Sex and Sex Worship," for which I enclose check for $8.00.

Name .....

Address .....

B. B. CULTURE

You may have a case today in which the lactic treatment is distinctly indicated.

A prescription for B. B. CULTURE will give you the desired results in a minimum of time.

B. B. CULTURE LABORATORY, Inc.
YONKERS, NEW YORK

"A NEW GERMICIDE"

for
Use in the Genito-Urinary Tract

Mercurochrome--220 Soluble
Sodium Salt

Readily soluble in water in all proportions. Supplied in 10 gram bottles at the advanced price of $1.50 per bottle to physicians.
Special literature sent on request.

Mercurochrome has been used with wonderful results by Genito-Urinary men in this vicinity.

Special attention given mail orders

Doster-Northington Drug Company
Surgical Instruments and Hospital Supplies, Wholesale Drugs
BIRMINGHAM, ALA.

FOR DIET CONTROL IN INFANT FEEDING

The choice of these dependable products affords the physician convenient means of selecting food mixtures suited to the individual requirements of individual cases.

MEAD'S DEXTRI-MALTOSE No. 1

(With Sodium Chloride, 2%)

For general use in infant feeding. Especially indicated in infants recovering from diarrhoea, infants with feeble powers of digestion who have tendencies to diarrhoea. Valuable as an addition to Protein Milk.

MEAD'S DRY MALT SOUP STOCK

For difficult feeding cases. Indicated in marasmus, weight disturbance (failure to gain), infants afflicted with recurrent diarrhoea from intestinal indigestion, and those cases occasionally met with which do not do well on milk, water and sugar mixtures.

MEAD'S DEXTRI-MALTOSE No. 3

(With Potassium Carbonate, 2%)

For use in constipation, when boiled feedings are used, or where the addition of potassium to the infant's diet is indicated.

Full information regarding these products furnished on request.

MEAD JOHNSON & CO., Evansville, Ind.

Arsenic and Mercury are Indispensable in the Treatment of Syphilis. We recommend

SALVARSAN (Arsphenamine-Metz) or **NEOSALVARSAN** (Neoarsphenamine-Metz)

powerful and easily administered spirochetecides which are as efficacious as the imported products,

and

BICHLORIDOL (Mercury Bichloride) or **SALICIDOL** (Mercury Salicylate)

put up in COLLAPSULES, (compressible ampules) which insure absolute accuracy of dosage with absence of pain after intramuscular injection.

This combination of anti-luetics has no superior in the therapeutic field. Literature upon application to

H. A. METZ LABORATORIES, Inc.,
122 HUDSON STREET,
NEW YORK.

RADIUM

STANDARD CHEMICAL CO.

CLINICAL data clearly prove the effectiveness of Radium in certain benign and malignant growths.

Departments of Physics and Medicine for instruction in the physics and therapeutic application of Radium.

Sold with U. S. Bureau of Standards Certificate.

Information upon request regarding
Tube and Needle Applicators for deep therapy.

Patented glazed plaques for dermatological conditions.

And apparatus for Radium Emanation.

RADIUM CHEMICAL CO.

PITTSBURGH, PA.

BOSTON
Little Building

CHICAGO
Marshall Field Annex Building

SAN FRANCISCO
Flood Building

Astor Trust Bldg. NEW YORK Fifth Av. & 42 St.

B&B Formaldehyde Fumigators

We Stand With You

We stand with you who stand for high requirements in this important line.

We stand for sterility

B & B Dressings are not merely sterilized in the making. They are sterilized after being packed.

Not in a perfunctory way, but by live steam following a vacuum. Not in an uncertain way. Center fibers are constantly submitted to incubator tests.

We stand for protection

B & B Handy-Fold Gauze comes in sealed parchmine envelopes, all sterilized after sealing.

B & B Absorbent Cotton can be used without removing the roll from the carton.

We stand for efficiency

B & B Formaldehyde Fumigators conform to Government requirements. They do what you want done.

We stand for convenience

B & B Plaster Paris Bandages come in double-walled containers. Between the walls you find the extra loose plaster that you need.

They are wrapped in water permeable paper, so the wrapper need not be removed in the wetting.

We stand for perfection

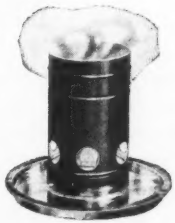
B & B Adhesive is a many-year evolution. It is made by experts who have devoted their lives to adhesive.

The formula is right. A rubber expert prepares for it a rubber that will age well. A master spreader, using great machines, spreads every inch alike.

We stand for exactness

The B & B laboratory is the model of its kind. B & B methods result from 26 years of scientific study. No surgical requirements are so extreme that we do not meet them.

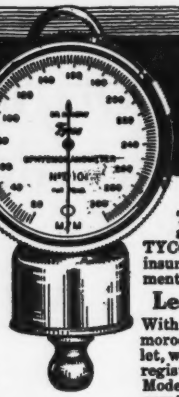
Your every use of B & B products will increase your respect for our methods.



BAUER & BLACK, Chicago, New York, Toronto

Makers of Sterile Surgical Dressings and Allied Products

RENT THIS TYCOS NINE MONTHS THEN IT'S YOURS



Easy Rental Purchase Plan

By our easy rental purchase plan, after a first payment of only $2.50 we will rent this TYCOS to you for nine months at $2.50 a month, at the end of which time it is your absolute property. You pay only the cash price—with no interest and no extras—and have

Nine Full Months To Pay

Just dignified credit. No red tape or embarassing questions. You take no risk. We absolutely guarantee this genuine Dr. Rogers' New 1919 Model TYCOS and it is also fully guaranteed by the makers.

Standard Of The World

There is only one standard of the world—reliable—dependable—accurate—and that is the TYCOS, which has been adopted and is used by all insurance companies, the United States Government and medical authorities.

Leather Case and Booklet Free

With each TYCOS we give you free a handsome morocco leather case and a 44-page instruction booklet, which tells exactly how to use it. The TYCOS registers both systolic and diastolic pressures. Modern, scientific diagnosis demands the aid of an accurate instrument for determining blood pressure.

Dr. Rogers' Genuine 1920 *Model Self-verifying Sphygmomanometer*

Cash Price Everywhere $25 But we will send it to you upon receipt of only $2.50 and allow you ten days free trial. If then you wish to keep it, simply pay the balance, $22.50, in nine small monthly payments of $2.50, and the instrument is yours. You cannot buy it for less anywhere else. You cannot buy it on such easy terms except by the Aloe Easy Rental Purchase Plan.

Ten Days Free Trial Just enclose first month's rent—$2.50 and we will ship the TYCOS at once. Try it thoroughly for ten days. Give it every test you can. If you are willing to part with it, send it back at our expense and get your money. If pleased, then pay only $2.50 a month for 9 months. SEND FOR YOUR TYCOS TODAY. Do it NOW. Let it PROVE it's usefulness to you. It is so easy to own that you'll never miss the money.

A. S. ALOE COMPANY, 561 Olive Street, ST. LOUIS, MO.

The Management of an Infant's Diet

Constipation

In a very large percentage of cases of constipation in early life, this annoying condition is due largely to some fault in the diet, and usually the difficulty can be easily traced to an incomplete digestion of protein or of fat. By changing the food and advising a daily diet prepared according to

The Mellin's Food Method of Milk Modification

he condition is very often corrected immediately, for the reason that Mellin's Food helps materially in the digestion of cow's milk. In cases where the condition has persisted for some time, simple changes in the proportion of Mellin's Food, milk and water will soon bring about normal stools.

Practical suggestions relative to the readjustment of the diet are set forth clearly in the chapter on "Stools" in our book, "Formulas for Infant Feeding." We also have a pamphlet devoted particularly to the subject, and all of this literature will be sent to any physician upon request.

Mellin's Food Company, Boston, Mass.

WHAT DOES IT MEAN TO YOU

WHEN a manufacturer informs you he cannot make immediate delivery of the apparatus in which you are interested?

Do you stop to reason that it is due to the big demand for his particular apparatus that there is a waiting list?

The Victor Electric Corporation has the largest plant in the world specializing in the manufacture of x-ray and physical therapeutic apparatus—in spite of which fact we are obliged to ask you to wait for some goods for which there is an insistent demand.

An insincere promise might get your order, but this is not consistent with Victor policy. Victor promises are not made to be broken.

Just reason this out—then to be fair to yourself do not allow a delivery date to be the all-absorbing factor in the selection of apparatus which is all important to your work.

VICTOR ELECTRIC CORPORATION

Manufacturers of Roentgen and Physical Therapeutic Apparatus

66 Broadway
Cambridge, Mass.

CHICAGO
Jackson Blvd. and Robey

New York
131 E. 23d St.

Sales Offices and Service Stations in all principal cities

Now, Brown—

Why don't you try it yourself?"

The rating of the

Alpine Sun Lamp

as a

THERAPEUTIC AID

is well established. The most progressive men are using this lamp with satisfaction and profit. It meets a variety of indications.

A booklet containing some of the evidence that has induced a favorable decision from competent judges will be sent you on request. Write for booklet No. 30.

HANOVIA CHEMICAL & MFG. COMPANY

NEWARK, N. J.

NOW ENTIRELY AMERICAN

MADE BY THE ORIGINAL PROCESSES

Sajodin

PALATABLE and EFFICIENT IODIN MEDICATION

Especially for Prolonged Use as in

Arteriosclerosis

and when Iodides disagree

Helmitol

AGREEABLE and RELIABLE URINARY ANTISEPTIC

For Acute and Chronic Cases of

Cystitis, Urethritis

and Renal and Other Infections

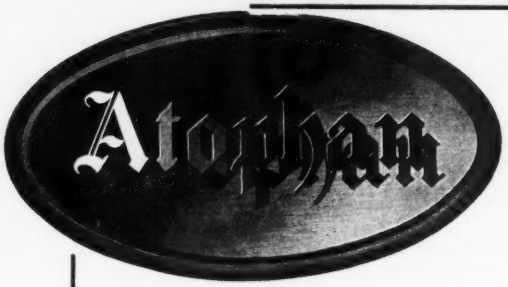
VERONAL and VERONAL-SODIUM

The Well-Known Hypnotics

SOLD EXCLUSIVELY BY

WINTHROP CHEMICAL COMPANY, Inc.

189-191 FRANKLIN STREET NEW YORK, N. Y.



When a patient comes to you with that rather vague complaint "Rheumatism"—

What he wants first, and wants quick, is relief.

Relief from the Pain, the Inflammation and the Congestion.

Relief from the Soreness and Stiffness of Limbs.

This accomplished, he will be ready and eager for the course of general treatment mapped out by you for his particular type of Rheumatism.

ATOPHAN seldom fails to relieve, and in the acute forms, it is often all that is needed.

Its freedom from untoward by-effects on the heart, the kidneys and the gastro-intestinal tract is as freely and generally conceded as its superior efficacy.

U. S. A.-Made and Available Everywhere.

Literature and Information from

SCHERING & GLATZ, Inc., 150 Maiden Lane, New York

CALCREOSE

BETTER CREOSOTE MEDICATION

Dr. Lawrason Brown of the Trudeau Sanatorium, Trudeau, New York, speaking of the use of creosote in the treatment of pulmonary tuberculosis, in Osler's Modern Medicine, Vol. I, p. 504, says:

"* * * seems to act almost as a specific on the accompanying bronchorrhea and intercurrent attacks of simple bronchitis."

The principal reason why creosote has not been used to a greater degree is because of its untoward effects on the stomach.

CALCREOSE contains approximately 50% of creosote.

CALCREOSE has full creosote action but is free from any untoward effects on the stomach, even when administered in comparatively large doses. Therefore,

CALCREOSE is an ideal form of creosote medication.

VISIT SPACES 50 AND 51 A.M.A. EXHIBIT, NEW ORLEANS, LA., APRIL 26-30

THE MALTBIE CHEMICAL COMPANY,
Newark, N. J.

ASSURE YOURSELF OF THE BEST

TAQUININE
(Quinine Ethyl Carbonate)
Tasteless Quinine
Devoid of the effects of cinchonism
Particularly Ideal for Children
1 ounce packages. 2 gr. Tablets. 5 gr. Tablets

ARSAMINOL
and
NEO-ARSAMINOL
The Best Arsphenamine Preparations
Low Toxicity
Solubility
High Therapeutic Value
U. S. P. H. S. and Clinically Tested

HATA'S INJECTION APPARATUS
Latest and Most Convenient Apparatus on the market
Also
Kaufman's Fordyce Kaliski Outfits
All Tested Syringes

HIRATHIOL
(Ammonii Sulpho-ichthyolicum)
Mininum Sulphur Content 9 1-2 per cent.
Awarded U. S. Government Contract 1920
1 lb. Tins
1 lb., 1-2 lb., 1-4 lb. bottles
Hirathiol Ointment in 2 oz. Tins.

"You are cordially invited to visit our Booth at the A. M. A. Meeting at New Orleans, April 26-30."

If your dealer can not supply you order direct from us.

Takamine Laboratory, Inc.
Manufacturing Chemists

N. Y. Office
12 Dutch St.

Home Office & Laboratories
Clifton, N. J.

Gentlemen:
Kindly send me literature, quotations and samples.
Name ----------
City ----------
State ----------

VAN ANTWERP BUILDING

BIOLOGICALS

KEPT UNDER THE MOST IDEAL CONDITIONS

We run a complete refrigeration plant with day and night service.

We stock only the recognized standard lines
MULFORD'S PARKE-DAVIS
LEDERLE'S

VAN ANTWERP'S DRUG CORPORATION
Mobile, Alabama
Order of us---We Market Only Reliable Products

CHLORAZENE

A Real Antiseptic

Developed by Dr. Dakin as an Improvement over the hypochlorite solutions used by Carrel.

Fifty thousand physicians and surgeons are now using, with satisfaction, this popular, powerful, Council passed antiseptic.

CHLORAZENE is rapidly becoming the universal antiseptic. This is not surprising when you know that **CHLORAZENE** is **fifty times** more powerful than **phenol**, yet is practically non-toxic. It is safe, stable and remarkably convenient, in tablet and powder form, for immediate use.

Try **CHLORAZENE** in all pus infections, in surgery, wounds, ulcers, burns and carbuncles, in fact wherever there is pus. Use it in nasal and throat infections, as a douche and in your Genito-Urinary cases.

CHLORAZENE is supplied in Tablets and Powder form. Also as CHLORAZENE SURGICAL CREAM, CHLORAZENE SURGICAL DUSTING POWDER, CHLORAZENE GAUZE and AROMATIC CHLORAZENE POWDER for oral and nasal use.

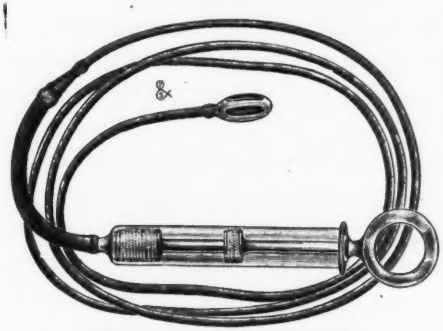
Send for interesting booklet on the Dakin Antiseptics CHLORAZENE AND DICHLORAMINE-T

Urge your druggist to stock CHLORAZENE for your convenience in prescribing. In the meantime your orders will be filled directly from our home office or convenient branch points, as listed below.

THE ABBOTT LABORATORIES

Home Office and Laboratories' Dept. 79
CHICAGO

New York San Francisco Seattle Los Angeles Toronto Bombay



THE "REHFUS" STOMACH TUBE

TWO HANDY INSTRUMENTS

for use in obtaining stomach contents for Diagnostic work. Also a full line of Surgical Instruments and Hospital Supplies carried in stock for immediate shipment.

EWALD EVACUATOR

Catalogue of Surgical Instruments and Hospital Supplies sent on request. Special attention given Mail Orders.

DOSTER-NORTHINGTON DRUG CO.

SURGICAL INSTRUMENTS AND HOSPITAL SUPPLIES

Wholesale Drugs - - - - BIRMINGHAM, ALABAMA

The Kernan Hospital for Crippled Children

BALTIMORE, MARYLAND

One of the largest and best equipped Orthopaedic Hospitals in the country. The grounds cover sixty-five acres, containing private herd of cows, poultry, vegetable garden, parked lands and play grounds.

STAFF

Attending Surgeons

R. Tunstall Taylor, M.D.
Sydney M. Cone, M.D.
Compton Riely, M.D.
William Tarun, M.D.
William H. Daniels, M.D.
Frank Martin, M.D.
John Staige Davis, M.D.
Chas. Reid Edwards, M.D.
Gideon Timberlake, M.D.
John P. Bell, D.D.S.

Roentgenologists

J. Fletcher Lutz, M.D.
Henry J. Walton, M.D.

STAFF

Attending Physicians

Benjamin Tappan, M.D.
A. Duvall Atkinson, M.D.
Irving J. Speer, M.D.
Jno. R. Abercrombie, M.D.

Consulting Surgeons

W. S. Halsted, M.D.
John M. T. Finney, M.D.
Randolph Winslow, M.D.

Consulting Physicians

Lewellys F. Barker, M.D.
Thomas R. Brown, M.D.
W. S. Thayer, M.D.

The Surgical Building

For particulars and terms of admission, address

1102 North Charles Street Baltimore, Maryland

THE SARAH LEIGH HOSPITAL Norfolk, Va.

Announces the opening of a well equipped

Annex for Medical Cases

Staff

Southgate Leigh, M.D., F.A.C.S., Surgery and Gynecology.
Jas. H. Culpepper, M.D., Surgery and Orthopedic Surgery.
Stanley H. Graves, M.D., Genito-Urinary and Rectal Diseases.
F. H. Rinker, M.A., M.D., (Formerly Assistant Professor of Medicine, University of Wisconsin), Internal Medicine.
Harry Harrison, M.D., Internal Medicine and Nitrous Oxide Oxygen Anesthesia.
G. Bentley Byrd, M.D., Obstetrics.
J. W. Hunter, M.A., M.D., X-Ray.
E. G. Hopkins, M.D., Pathology.
S. B. Whitlock, M.D., Resident Physician.
L. L. Odom, R.N., Superintendent.
S. B. Preston, R.N., Assistant Superintendent.

Hospital For General Diagnosis and Nervous Diseases

"NORWAYS"

1820 E. 10th Street, Indianapolis, Ind.

An Institution devoted to the Research, Study and Diagnosis of all problems in Medicine and Surgery, especially of conditions involving the Nervous System. All newer methods of Diagnosis, particularly the Chemistry of the blood, spinal fluid, secretions and excretions of the body are employed. The importance of body metabolism and its relation to diseased conditions is emphasized.

The co-operation of physicians is invited. It is the policy of this Hospital to return patients to their home and family physician for treatment, at the earliest possible moment, after a diagnosis is made. Only at the request of the patient's physician will any case be kept in the Hospital beyond the necessary period of observation.

A complete staff of skilled specialists in co-operation.

For further particulars regarding rates, etc., write

DR. ALBERT E. STERNE or
DR. LARUE D. CARTER

"Norway" Hospital for General Diagnosis and Nervous Diseases.

SAINT ELIZABETH'S HOSPITAL

617 West Grace Street **RICHMOND, VIRGINIA**

A thoroughly equipped and modern private hospital for surgical and gynecological patients. **Absolutely fire-proof**—a desirable requirement in any building, but a necessity in a surgical hospital. Constructed of tapestry brick, Pennsylvania brown stone, and reinforced concrete. Location is excellent, very quiet, but accessible. The building is half a block from the Franklin street side of Monroe Park. Ventilation perfect—due to the general design of architect who is an authority on ventilation, and also to the patent Austral windows, which direct the air current towards the ceiling and not on the patient.

Only graduate nurses are employed.

All modern conveniences, such as silent electric light signals for patients and long distance telephone connections in every bedroom.

Two large and complete operating rooms with northern light are on the top floor, where they are practically free from dust. The hospital is open the entire year. No wards, only single or double rooms, with or without private bath.

An addition to St. Elizabeth's Hospital containing 18 beds has recently been completed, which makes a total capacity of 50 beds. The addition is of the same general construction as the original building.

A limited number of graduate nurses received for post-graduate instruction.

For information, apply to the Superintendent, MISS MYRA E. STONE, R. N., or to

J. SHELTON HORSLEY, M. D., Surgeon-In-Charge

ARTHUR S. BRINKLEY, M. D., Associate Surgeon.

DR. J. F. YARBROUGH'S SANATORIUM

COLUMBIA, ALABAMA

For the Special Treatment of PELLAGRA, "BRIGHT'S DISEASE" DYSPEPSIA AND INDIGESTION

TRAINED NURSES

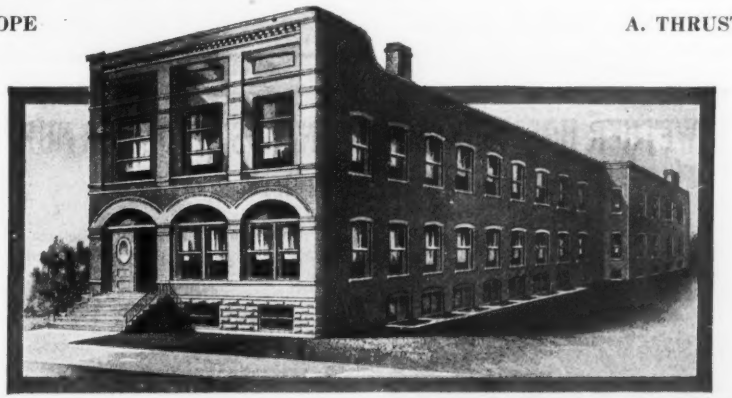
CONSULTING STAFF

M. S. DAVIE, M.D., Dothan, Ala. ROSS MOOTY, B.S., M.D., Columbia, Ala.

ALFRED SMITH FRASIER, F.A.C.S., Dothan, Ala.

HENRY GREEN, M.D., Dothan, Ala.

CURRAN POPE **A. THRUSTON POPE**



A MODERN up-to-date, private Infirmary equipped with steam heat, electric lights, electric fans, modern plumbing and superior furnishings. Solicits all cases of functional and organic nervous diseases, diseases of the stomach and intestines, rheumatism, gout and uric acid troubles, drug habits and alcoholism. Bed-ridden cases not received without previous arrangement.

Hydrotherapy, Mechanical Massage, Static, Galvanic, Faradic, Sinusoidal, High Frequency, Leucodescent and Arc Light, and X-ray treatments given by competent physicians and nurses, under the immediate supervision of the Medical Superintendent. Special laboratory facilities for diagnosis by urine, blood, blood serum, sputum, gastric juice, duodenal tube and X-ray. Recreation hall with pool and billiards for free use of patients.

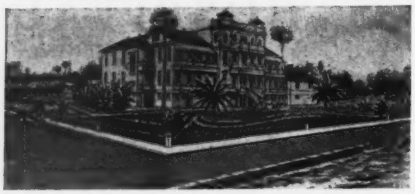
Rates include treatment, board, medical attention and general nursing. The Sanatorium is supplied from Pope Farm with vegetables, fruit, poultry, and eggs, also milk, cream, butter and buttermilk from its herd of registered Jerseys.

THE POPE SANATORIUM

Long Distance Phones
CUMB. M. 2122 HOME 2122

(Incorporated Established 1890)

LOUISVILLE, KENTUCKY
115 West Chestnut St.



BELVEDERE PRIVATE SANITARIUM

FRONTING ON MISSISSIPPI RIVER

NEW ORLEANS

Specializing in the treatment of Diseases of the Nervous System; functional Neuroses, Neurasthenia, Obesity and Nervous Exhaustion where rest and recuperation are desired.

Pasteur treatment administered.

Special attention and unusual facilities for the permanent care of Invalids.

Ideally situated on banks of the Mississippi River.

Rates vary from $35.00 a week up, according to accommodations selected and the requirements in Medical Attendance, Nursing and Treatment.

DR. B. F. GALLANT, Medical Director

The Buie Clinic

AND

MARLIN SANITARIUM-BATH HOUSE

MARLIN, TEXAS

N. D. BUIE, M.D. A. J. STREIT, M.D.
F. H. SHAW, M.D.

A thoroughly modern institution for chronic diseases, using Marlin's famous hot mineral waters and all late approved methods of diagnosis and treatment. The various departments are: Internal Medicine, Diagnosis, Urology, Syphilology, Pathology, Roentgenology, Dietetics, Electrotherapy, Eye, Ear, Nose and Throat and Hydrotherapy. Daily bath capacity 400.

STAFF

N. D. BUIE, M.D., Supt. and Diagnosis
F. H. SHAW, M.D., Internal Medicine
AUG. J. STREIT, M.D., Eye, Ear, Nose and Throat
L. M. SMITH, M.D., Urology and Syphilology
GEO. M. LIDDELL, M.D., Internal Medicine
S. S. MUNGER, M.D., Roentgenology
T. W. FOSTER, D.D.S.

THE MERIWETHER HOSPITAL AND TRAINING SCHOOL FOR NURSES, Inc

24 GROVE STREET, ASHEVILLE, N. C.

A thoroughly equipped and modern Hospital for Surgical, Gynecological, Medical, and Obstetrical Cases.

All modern conveniences, such as vacuum cleaners, electric elevators, sun porches, etc. Two thoroughly equipped operating rooms. Open entire year.

DIRECTORS

Dr. Ben M. Meriwether, President; Dr. E. R. Russell, Vice-President; Dr. Clyde E. Cotton, Secretary; Dr. W. J. Hunnicutt, Treasurer; Dr. M. L. Stevens, Dr. Arthur F. Reeves, Dr. Eug. B. Glenn.

STAFF

SURGICAL: Dr. Eug. B. Glenn, Chief; Dr. Ben M. Meriwether, Dr. A. T. Pritchard, Dr. Arthur F. Reeves, Dr. J. L. Adams.

MEDICAL: Dr. Chase P. Ambler, Chief; Dr. Clyde E. Cotton, Dr. M. L. Stevens, Dr. W. J. Hunnicutt, Dr. H. G. Brookshire, Dr. C. C. Orr.

EYE, EAR, NOSE AND THROAT: Dr. E. R. Russell, Dr. J. B. Greene, Dr. R. H. Buckner.

NEUROLOGY: Dr. B. R. Smith.

GASTROENTEROLOGY: Dr. A. W. Calloway.

DERMATOLOGY: Dr. C. W. Brownson.

G. U. AND DISEASES OF THE RECTUM: Dr. P. R. Terry.

PEDIATRICS: Dr. L. W. Elias.

ANAESTHETIST: Dr. W. J. Hunnicutt.

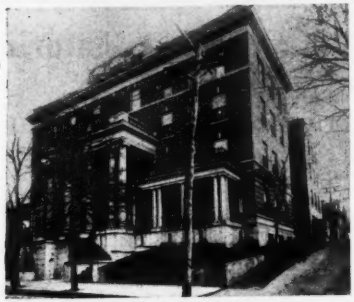
CHESTNUT LODGE

Rockville, Maryland

Near Washington, D. C. Baltimore & Ohio Railroad and Electric Line from Washington

This sanitarium under experienced management offers superior advantages for the treatment of patients suffering from Nervous and mild Mental Diseases, and for elderly persons needing skilled care and nursing; combining the equipment of a modern Phycopathic Hospital with the appointments of a refined home. The Hydrotherapy Department is complete in every detail including the Nauheim Baths for Arteriosclerosis, Heart and Kidney Diseases.

DR. E. L. BULLARD, Physician-in-Charge



Davis-Fischer Sanatorium

25-27 EAST LINDEN AVENUE
ATLANTA, GEORGIA.

A modern five-story fire-proof building for surgical and gynecological work. A limited number of medical and obstetrical cases received. No mental, contagious or alcoholics admitted. Equipped with all modern methods for diagnoses. X-Ray, pathological, bacteriological, serological and stomach contents.
Training school for nurses.

APPALACHIAN HALL :—: ASHEVILLE, N. C.

DR. WILLIAM RAY GRIFFIN
DR. BERNARD R. SMITH,
Physicians in Charge
Miss V. E. Lively
Supt. of Nurses

AN INSTITUTION FOR THE TREATMENT OF NERVOUS DISEASES

ADVISORY BOARD
Dr. C. V. Reynolds
Dr. M. H. Fletcher
Dr. C. L. Minor
Dr. W. L. Dunn

We have recently erected two additional buildings, thoroughly equipped with every modern convenience, including a most complete Hydrotherapy Department.

Situated at an altitude of 2500 ft. in the heart of the Blue Ridge Mountains of Western North Carolina. Superb lawn and 25 acres of beautifully wooded grounds.

For information address **DRS. GRIFFIN & SMITH, ASHEVILLE, N. C.**

The Lady Mary Maternity Home,

A STRICTLY ETHICAL AND PRIVATE REFUGE FOR SECLUDING AND PROTECTING

HIGH-CLASS UNMARRIED PREGNANT WOMEN

through confinement, without publicity, with medical care and trained nursing. Baby placed for legal adoption if arranged. Early entrance suggested, or soon after fifth month as possible. No criminal practices tolerated. City license. Ethical physicians may handle their own cases. Rigid investigation invited. Many years' hospital experience in this work. Rates reasonable. Correspondence confidential. *For details, address*

DR. J. E. GARRISON, Physician in Charge, Birmingham, Alabama.

Shortle's Albuquerque Sanatorium

FOR TUBERCULOSIS

ALBUQUERQUE, - - NEW MEXICO

Altitude 5,100 Feet. Rates Moderate. Climatic Conditions Unsurpassed.

A private sanatorium where the closest personal attention is given each patient. Complete laboratory and X-Ray equipment for diagnostic purposes. Compression of the lung and sun-bath treatment after the methods of Rollier. Steam heat, hot and cold water, electric lights, call bells, local and long distance telephones and private porches for each room. Bungalows if desired.

Situated but 1 1-2 miles from Albuquerque, the largest city and best market of New Mexico, permits of excellent meals and service at moderate price. **Write for Booklet B.**

A. G. Shortle, M.D., Medical Director

The Baker Sanatorium

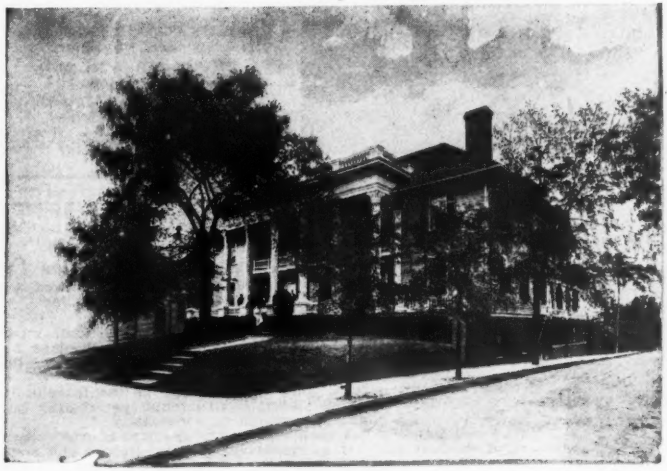
Colonial Lake
Charleston, S. C.

A new and thoroughly equipped hospital for the care of Surgical patients.

ARCHIBALD E. BAKER, M.D., F.A.C.S.
Surgeon in Charge

Robertson-Blackman Sanitarium

170-174 Capitol Avenue
ATLANTA



Hydrotherapeutic, Dietetic, Medical

Two of its distinctive features:

Treatment of Diabetes. (Allen Method)

Rest and Fattening Cure. (5 lbs. per week)

Rates, $30 to $50 per week. Good cuisine.

Homelike resort atmosphere.

Laboratory facilities.

Modern equipment.

For Information and Reprints address

W. W. BLACKMAN, M.D., Supt.

THE WATAUGA SANITARIUM

RIDGETOP, TENNESSEE.

For Tuberculosis in any Form.

STAFF:
Dr. Wm. Litterer
Dr. W. A. Bryan
Dr. O. N. Bryan
Dr. G. C. Savage
Dr. J. M. King
Dr. W. W. Winters
Dr. H. S. Shoulders

19 Miles North of Nashville, Henderson Division of L. & N. Ry.

Location ideal, elevation 1,000 feet, buildings mod ern; hot and cold water, gas lights, perfect sewerage and excellent water supply. Tuberculins and vaccines administered in suitable cases. X-Ray Diagnosis. Heliotherapy. Rates very reasonable.

Inquiries appreciated. Illustrated booklet on application.

DR. W. S. RUDE, Medical Director. **RIDGETOP, TENN.**

ARLINGTON HEIGHTS SANITARIUM

P. O. BOX 978, FORT WORTH, TEXAS

For Nervous Diseases and Selected Cases of Mental Diseases.

(Incorporated under laws of Texas)

WILMER L. ALLISON, M.D.
Resident Physician

BRUCE ALLISON, M.D.
Resident Physician

R. H. NEEDHAM, M.D.
Resident Physician

JAS. D. BOZEMAN, M.D.
Resident Physician

OCONOMOWOC HEALTH RESORT

OCONOMOWOC
WISCONSIN

New Building Absolutely Fireproof

For Nervous and Mild Mental Diseases and Addiction Cases

Five minutes walk from Interurban between Oconomowoc and Milwaukee on main line C. M. & St. P. Ry. 30 miles west of Milwaukee

Built and equipped to supply the demand of the neurasthenic, border-line and undisturbed mental case, for a high-class home free from contact with the palpably insane, and devoid of the institutional atmosphere.

Fifty acres of natural park in the heart of the famous Wisconsin Lake Resort region. Rural environment, yet readily accessible. A beautiful country in which to convalesce.

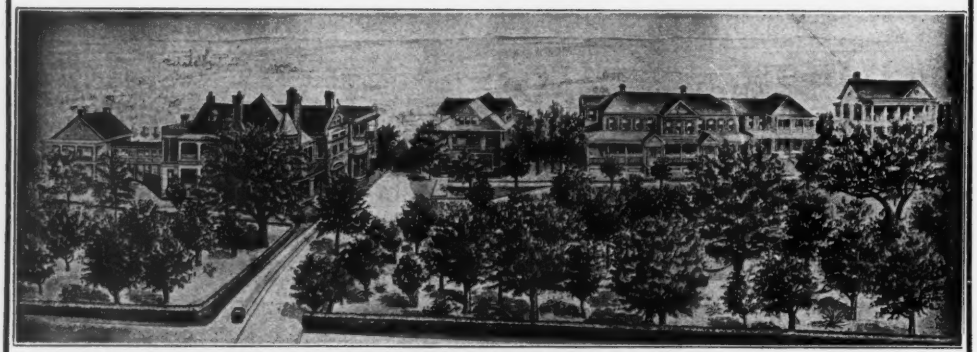
The new building has been designed to encompass every requirement of modern sanitarium construction, the comfort and welfare of the patient having been provided for in every respect. The bath department is unusually complete and up-to-date. Work-therapy and re-educational methods applied.

Number of patients limited, assuring the personal attention of the resident physician in charge.

Arthur W. Rogers, B.L., M.D., Resident Physician in Charge

DR. MOODY'S SANITARIUM

SAN ANTONIO, TEXAS



For Nervous and Mental Diseases, Drug and Alcohol Addictions and Nervous Invalids Needing Rest and Recuperation

Established 1903. Strictly ethical. Location delightful summer and winter. Approved diagnostic and therapeutic methods. Modern clinical laboratory. 7 buildings, each with separate lawns, each featuring a small separate sanitarium, affording wholesome restfulness and recreation, in doors and out doors, tactful nursing and homelike comforts. Bath rooms en suite, 100 rooms, large galleries, modern equipments, 15 acres, 350 shade trees, cement walks, playgrounds. Surrounded by beautiful park, Government Post grounds and Country Club.

T. L. Moody, M.D., Supt. and Res. Physician.
J. A. McIntosh, M.D., Res. Physician. C. W. Stevenson, M.D., Res. Physician.

HILLCREST MANOR

ASHEVILLE, N. C.

LOUIS E. BISCH, M.D., Ph.D.

(Resident Medical Director)

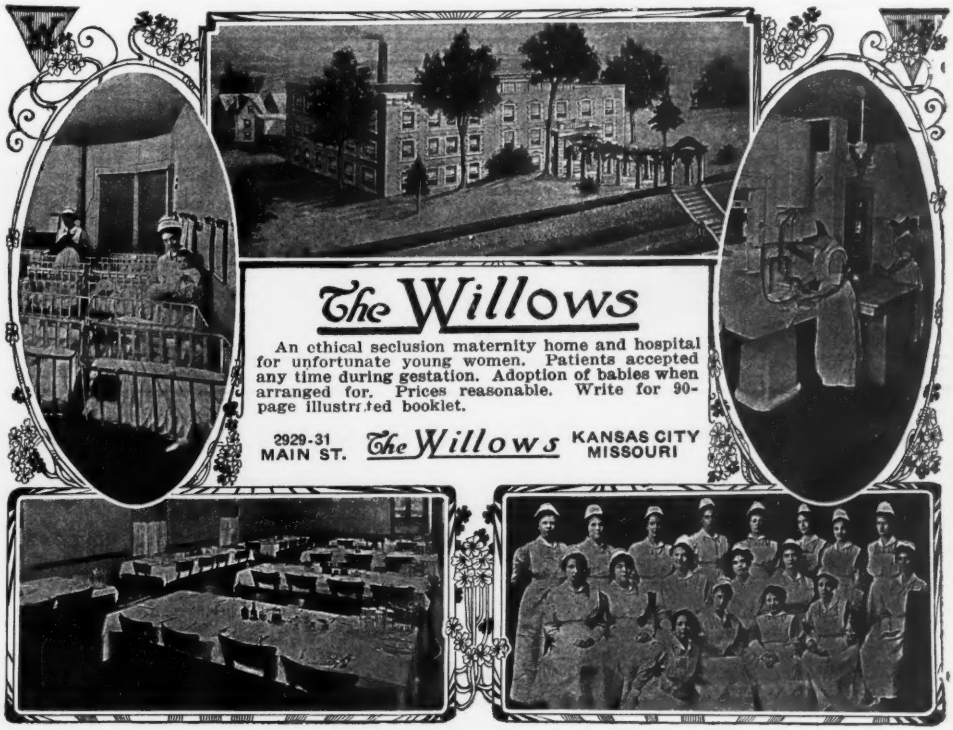
Sanitarium

Devoted to the Scientific Treatment of Organic and Functional Nervous Diseases.

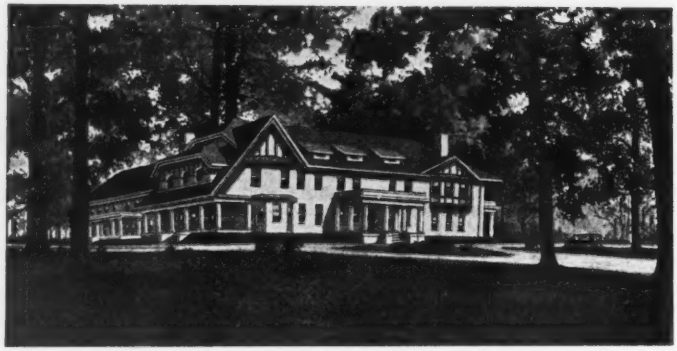
A thorough, detailed, individual examination and study made of each patient. All the latest methods of psychotherapy employed—including psychoanalysis. Trained, graduate nursing—large, airy, cheerful rooms—the seclusiveness of seventeen acres of wooded hills with lawns, orchards, and vineyard—wholesome food, cooked under supervision of a dietitian—a congenial, restful atmosphere in an up-to-date building—air, water, climate and scenery unsurpassed.

Patients are Examined for Admission to Hillcrest Manor
At the City Offices
Suite 206-208 Haywood Building
Asheville, N. C.

(Positively no Insane or Tubercular Persons are Admitted)


The Willows
An ethical seclusion maternity home and hospital for unfortunate young women. Patients accepted any time during gestation. Adoption of babies when arranged for. Prices reasonable. Write for 90-page illustrated booklet.
2929-31 MAIN ST.
The Willows
KANSAS CITY MISSOURI

LYNNHURST SANITARIUM



A HIGH-CLASS INSTITUTION FOR NERVOUS DISEASES, MILD MENTAL DISORDERS AND DRUG ADDICTION.

Situated in the suburbs of Memphis on 28 acres of beautiful woodland and ornamental shrubbery Modern and approved methods in construction and equipment. Thorough ventilation, sanitary plumbing, low pressure steam heat, electric light, fire protection, and an abundance of pure water. Special facilities for giving Hydrotherapy, Electrotherapy, Massage, Physical Culture and Rest Treatment. Experienced nurses and house physician. An improved treatment for Opium-Morphin addiction.

S. T. RUCKER, M.D., Director Medical Dep't.

Memphis, Tenn. Bell Telephone Connections

KENILWORTH SANITARIUM

KENILWORTH, ILLINOIS

(Established 1905)

(C. & N. W. Railway. Six Miles North of Chicago.)

Built and equipped for the treatment of nervous and mental diseases. Approved diagnostic and therapeutics methods.

An adequate night nursing service maintained. Sound proof rooms with forced ventilation. Elegant appointments. Bath rooms en suite, steam heating, electric lighting, electric elevator.

Resident Medical Staff:

Minta P. Kemp, M.D. Sherman Brown, M.D.

Sanger Brown, M.D.

Chicago Office 59 East Madison Street

Telephone Randolph 5794 Hours 11 to 1, by appointment only

All correspondence should be addressed to

Kenilworth Sanitarium Kenilworth, Ill.

WAUKESHA SPRINGS SANITARIUM

For the Care and Treatment of

NERVOUS DISEASES

Building Absolutely Fireproof

BYRON M. CAPLES, M. D., Supt.

Waukesha, - - - - Wisconsin

Department of

RADIUM THERAPY

(Endowed)

HARBIN HOSPITAL

Rome, Ga.

The Thompson Sanatorium

For the treatment and education of tuberculous patients. Seventy-five miles northwest of and twelve hundred feet higher than San Antonio. Mild winters, cool breezy summers. Hospital Building and Hollow Tile Cottages with modern conveniences. Beautiful mountain scenery. Prices moderate. Trained nurses.

SAM E. THOMPSON, M.D.
Superintendent and Medical Director

H. Y. SWAYZE, M.D.
Associate Medical Director

KERRVILLE, TEXAS

Nashville Private Maternity Hospital

For the care and protection of unfortunate young women.

DR. J. H. PRESTON, Physician

Address: MRS. L. SWEENEY
1230 Second Avenue, South
Phone, Main 3791. NASHVILLE, TENN.

Westbrook Sanatorium, Richmond, Virginia

THROUGH THE MEDICAL STAFF,

DOCTORS JAS. K. HALL, P. V. ANDERSON AND E. M. GAYLE

WISHES TO ANNOUNCE TO THE PROFESSION THE OPENING ON NOVEMBER FIFTEENTH OF AN ADDITION TO THE INSTITUTION OF TWO BRICK BUILDINGS—ONE FOR MEN AND ANOTHER FOR WOMEN.

THE PLANT now consists of nine separate buildings situated in the midst of grounds which embrace eighty-five acres. The lawn is large and beautifully shaded; there are private walks and drives, and the institution affords the quietness and serenity of the country within sight of the city.

Rooms may be had single or en suite, with or without private baths. Small cottages, suitable for one patient, are also available.

Treatment is limited to Nervous Disorders, Mild Mental Affections, and to Alcoholic and Drug Habituation. Nurses and attendants are trained for this special work and the Sanatorium furnishes every facility for the rational treatment of such patients.

Life in the out-of-doors, combined with properly selected work for each patient, constitutes an important therapeutic measure.

The three physicians live at the Sanatorium and devote their entire attention to the patients.

BOOKLET UPON REQUEST

Dr. Brawner's Sanitarium

ATLANTA, GEORGIA

For Nervous and Mental Diseases, General Invalidism and Drug Addictions

The sanitarium is located on the Marietta trolley line, 10 miles from center of city, near a beautiful suburb, Smyrna. Grounds consist of 80 acres. Buildings are steam heated, electrically lighted, and many rooms have private baths. Patients have many recreations such as tennis, croquet, baseball and automobiling. Reference: The Medical Profession of Atlanta. Address

Dr. JAS. N. BRAWNER,
701-2 Grant Bldg. Atlanta, Ga.

PETTEY & WALLACE SANITARIUM

958 S. Fifth Street
MEMPHIS, TENN.

FOR THE TREATMENT OF

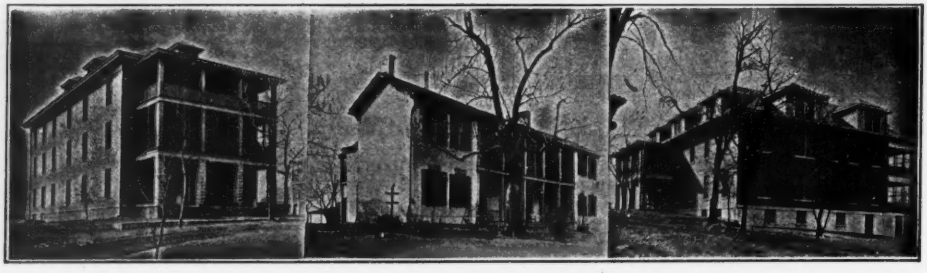
Drug Addictions, Alcoholism, Mental and Nervous Diseases

A quiet, home-like, private, high-class institution. Licensed. Strictly ethical. Complete equipment. Best Accommodations.

Resident physicians and trained nurses.

Drug patients treated by Dr. Pettey's original method.

Detached building for mental patients.

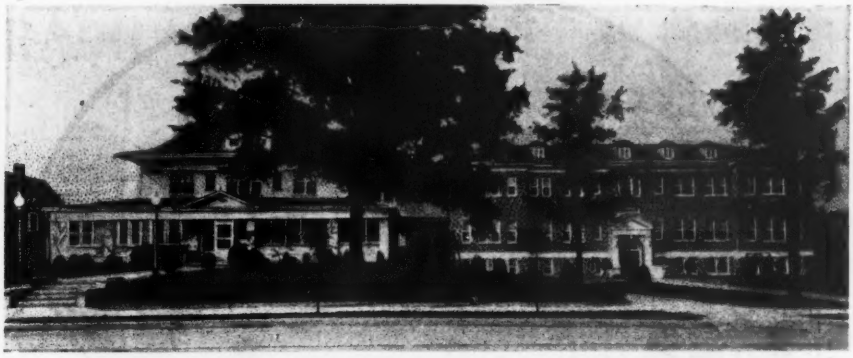


City View Sanitarium

(Established 1907)
JOHN W. STEVENS, M.D.,
Physician-in-Charge
Telephone Main 2928
Rural Route No. 1 Nashville, Tennessee

For the Treatment of MENTAL and NERVOUS DISEASES and ADDICTIONS.

New Fifty-Room Department completed January, 1915. Now have two new buildings, one for each sex. A thoroughly modern and fully equipped private hospital, operating under state license. Large, commodious buildings offering accommodations to meet the desires of the most exacting. Situated out of town in a quiet, secluded place. Large, shady grounds. Specially trained nurses. Two resident physicians. Capacity 65. References: Medical Profession of Nashville.



BIRMINGHAM INFIRMARY

SURGICAL MEDICAL GYNECOLOGICAL OBSTETRICAL

A thoroughly equipped and modern general hospital. Accommodates three hundred patients. All conveniences. Completely equipped. Modern pathological, bacteriological and x-ray laboratories. Sufficient Radium for treatment of all conditions in which Radium is indicated. All laboratories in charge of competent, experienced men.

EDUCATIONAL DEPARTMENTS—Training school for nurses in charge of graduate, registered nurses. Pupil nurses received on favorable terms. Special six months course in dietetics and laboratory work given. Graduate nurses received for post graduate instruction.

For information and catalog apply to Mrs. B. E. Golightly, R. N., Superintendent.

BIRMINGHAM, ALA.

DR. CHARLES M. NICE, Medical Director

DR. W. C. GEWIN, Surgeon in Charge

Long Distance Phone, West End 110

J. C. KING, M.D.
GUY B. DENIT, M.D.

ST. ALBANS SANATORIUM, Inc.

Long Distance Phone 75
P. O. BOX 84

RADFORD, VIRGINIA

The Hydrotherapy Department is complete in every detail. Continuous Nauheim and Tonic Baths.

Special emphasis given to Rest, Diet, Occupation, Massage and Electricity.

Clinical Laboratory fully equipped.

A thoroughly equipped and modern Private Sanatorium for the diagnosis and treatment of chronic medical, nervous, and mild mental disorders. It is situated 2,000 feet above sea level in the famous blue grass region of Virginia. There are two large colonial brick buildings connected by a sun parlor 105 feet long. Rooms single or en suite, with or without private baths. Accommodations for fifty patients. Modern and approved methods used in every department. The nurses are specially trained to care for nervous patients.

For details write for descriptive pamphlet.

OXFORD RETREAT

OXFORD, OHIO

Nervous and Mental Diseases
Alcohol and Drug Addictions

FOR MEN AND WOMEN

96 Acre Lawn and Forest. Buildings Modern and Fire Class in all Appointments. Thoroughly Equipped. Of Easy Access—39 Miles From Cincinnati, on C. H. & D. R. R. 10 Trains Daily.

THE PINES

An Annex for Nervous Women

Write For Descriptive Circular

R. HARVEY COOK, M.D., Physician-in-Chief

The Cincinnati Sanitarium

Inc. 1873

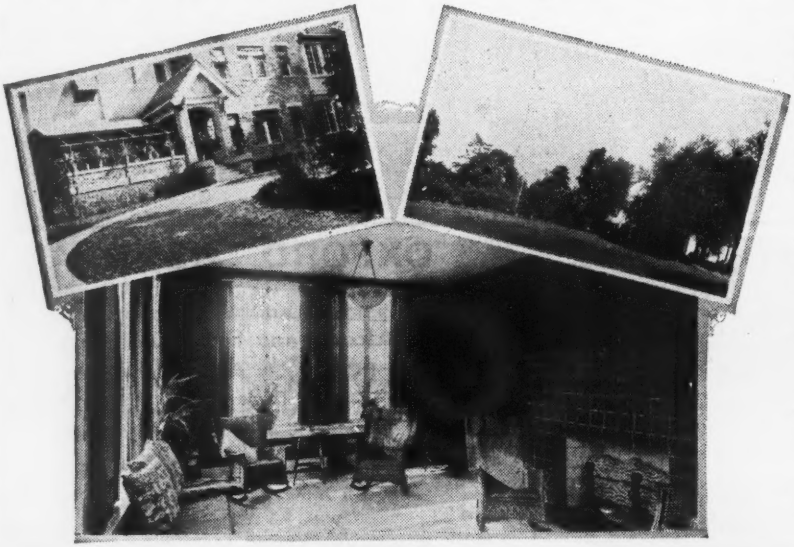
For Mental and Nervous Diseases.

A strictly modern hospital fully equipped for the scientific treatment of nervous and mental affections. Situation retired and accessible. For details write for descriptive pamphlet.

F. W. Langdon, M.D.,
Visit. Consultant
C. B. Rogers, M.D.,
Resident Medical Director
Egbert W. Fell, M.D.,
Res. Clinical Director

H. P. COLLINS, Business Manager
Box No. 4, College Hill
CINCINNATI, OHIO

"REST COTTAGE" College Hill, Cincinnati, Ohio



For purely nervous cases, nutritional errors and convalescents.

Completely equipped for hydrotherapy, massages, etc.

Cuisine to meet individual needs.

F. W. Langdon, M.D., Visiting Consultant

Egbert W. Fell, M.D., Resident Clinical Director

C. B. Rogers, M.D., Resident Medical Dircetor

H. P. Collins Business Manager

RADIUM-THERAPY DEPARTMENT

of

THE BIRMINGHAM INFIRMARY

Established 1916

Radium in any form for the therapeutic administration where indicated.

Address communications to

BIRMINGHAM INFIRMARY

BIRMINGHAM, ALA.

Dr. W. C. Gewin, President Dr. Chas. M. Nice, Secretary

The Tucker Sanatorium, Inc.

Madison and Franklin Streets
RICHMOND, VIRGINIA

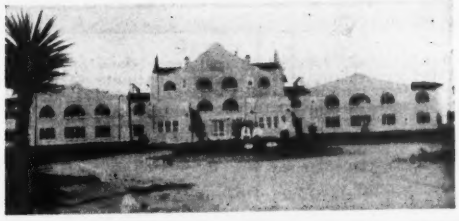
This is the Private Sanatorium of Dr. Beverley R. Tucker

The Tucker Sanatorium is for the treatment of nervous diseases. Insane and acute alcoholic cases are not taken. The Sanatorium is large and bright, surrounded by a lawn and shady walks and large verandas. It is situated in the best part of Richmond and is thoroughly and modernly equipped. There are departments for massage, medicinal exercises, hydrotherapy, occupation and electricity. The nurses are especially trained in the care of nervous cases.

THE HENDRICKS - LAWS SANATORIUM, FOR TUBERCULOSIS

El Paso, Texas

CHAS. M. HENDRICKS
J. W. LAWS
Medical Directors



One of the most modern and thoroughly equipped private institutions for the treatment of tuberculosis. High-class accommodations. *Fireproof construction.* Individual sleeping porches. Excellent cuisine. Altitude 4000 feet. Climate ideal all of the year. For further information, address

M. R. HARVEY
President

DOCTORS' COLLECTIONS

NO COLLECTIONS, NO PAY

Endorsed by Physicians and the Medical Press

DR. H. A. DUEMLING, Fort Wayne, Indiana, says: "I unhesitatingly recommend your Collection Service to my co-workers in the Medical Fraternity." (Grand total collections made for Dr. Duemling to Feb. 20, 1920, amounts to $11,038.27).

REFERENCES: National Bank of Commerce, Missouri Savings Association Bank, Bradstreet's, or the Publishers of this Journal; thousands of satisfied clients everywhere. Clip this advertisement and attach to your lists and mail to

Physicians & Surgeons Adjusting Association

Railway Exchange Bldg., Desk 29
Kansas City, Missouri

(Publishers Adjusting Association, Inc., Owners. Est. 1902)

Medical College of Virginia

UNIVERSITY COLLEGE OF MEDICINE
MEDICAL COLLEGE OF VIRGINIA
(Consolidated)

Medicine-Dentistry-Pharmacy

STUART McGUIRE, M.D., Dean

New college building, completely equipped and modern laboratories. Extensive Dispensary service. Hospital facilities furnish 400 clinical beds; individual instruction; experienced faculty; practical curriculum. For catalogue or information address

J. R. McCAULEY, Secretary

1140 E. Clay Street Richmond, Virginia

RADIUM THERAPY

in connection with

NEWELL & NEWELL Sanitarium

705-707 Walnut St., Chattanooga, Tenn.

An ample supply of Radium for the treatment of all conditions in which Radium is indicated.

SANITARIUM STAFF

E. T. Newell, M.D.
E. D. Newell, M.D.
G. P. Haymore, M.D.
J. H. St. John, M.D.

Glenwood Park Sanitarium, Greensboro, North Carolina.

SUCCEEDING TEL FAIR SANITARIUM

The Glenwood Park Sanitarium is ideally located in a quiet suburb of Greensboro, having all the advantages of the city, yet sufficiently isolated to enable our patients to enjoy restful quietude and entire freedom from the noise and distractions incident to city life.

CLASS OF PATIENTS—Those who need help to overcome the bondage of habit. Rest from overwork, study or care. Diversion for the depressed and disquiet mind—and such as are suffering from any disease of the nervous system. The treatment consists of the gradual breaking up of injurious habits, and the restoration to normal conditions, by the use of regular and wholesome diet, pure air, sunlight, and exercise, with such other remedies as are calculated to assist nature in the work of restoration.

Special attention is given to the use of electricity. Twenty years' experience has proven it invaluable in cases of nervous prostration, incipient paralysis, insomnia, the opium and whiskey habits, and those nervous affections due to uterine or ovarian disorders.

For further particulars and terms, address W. C. ASHWORTH, M.D., Superintendent.

RADIUM AND X-RAY LABORATORY

425-429 Woodward Building

BIRMINGHAM, ALA.

For the treatment of MALIGNANT and BENIGN conditions, in which the use of Radium and ALLIED MEASURES has been definitely established.

Address:

Dr. WALTER A. WEED, Director

425 Woodward Building, Birmingham, Alabama

The Radium Institute of New Orleans

In Connection With

TOURO INFIRMARY

DIRECTING BOARD

Dr. S. M. D. Clark Dr. H. S. Cocram Dr. W. Kohlmann Dr. U. Maes Dr. E. D. Martin Dr. R. Matas Dr. F. W. Parham Mr. A. B. Tipping

For the treatment of conditions in which the use of Radium is indicated.

All correspondence should be addressed to the Radium Institute.

DR. E. C. SAMUEL, Radio-Therapist. **A. B. TIPPING, Secretary.**

UNIVERSITY OF LOUISVILLE

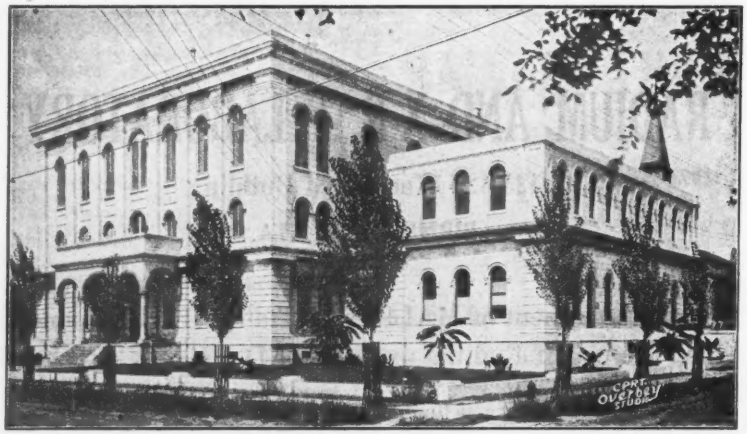
Medical Department

Eighty-third Annual Session begins Sept. 20. 1920. Entrance requirements for the 1920-21 session—two years of College work in Physics, Chemistry, Biology and English, in addition to the fifteen units' work in an accredited, standard high-school.

A premedical course of instruction is given in the Academic department of the University. A combined B.S., M.D., degree granted after two years of study in College of Arts and Sciences and four years in Medical Department.

Well equipped laboratories under full-time teachers in Medicine and Surgery. Clinical work in the New Million-dollar City Hospital. All time teachers in Clinical Medicine and Surgery. For further information and catalogue, address the Dean.

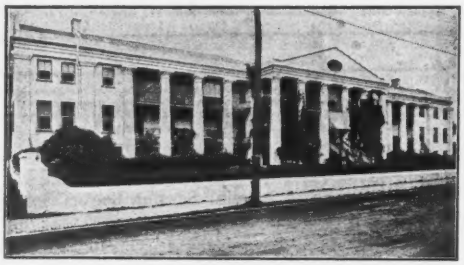
HENRY ENOS TULEY, M.D.,
Louisville, Ky.



University of Alabama, School of Medicine

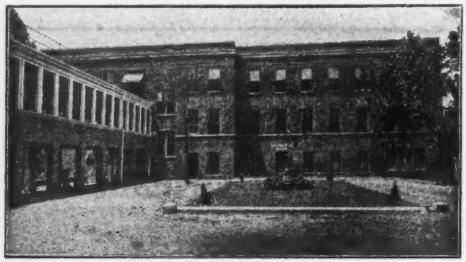
MOBILE, ALABAMA

Rated Class A. Registered "Standard" by N. Y. State Educational Department. Laboratories of Anatomy, Physiology, Biology, Bacteriology, Pathology and Pharmacology. Equipped with latest standard apparatus. Operated by all-time Teachers. Instruction in Junior and Senior years mostly clinical. Below are shown four of the Institutions affiliated with us for clinical work.



Mobile City Hospital

206 beds. Internes appointed and controlled by the School. Clinical material abundant, studied by classes divided into small sections under all-time teacher.

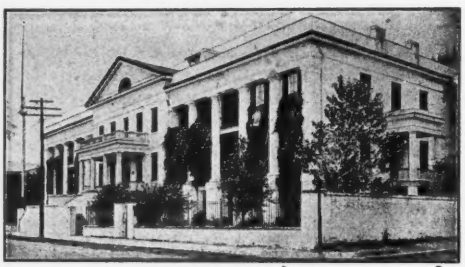


Mobile City Dispensary

Controlled and operated by the School. Over 10,000 patients treated by students last session. Under direction of experienced teachers.

Alabama Maternity and Infant Home

Mobile, Ala. Capacity, 10 maternity cases and 100 infants. Professors of Obstetrics and Pediatrics control.



U. S. Marine Hospital

Mobile, Ala. Surgeon in charge Professor of Tropical Medicine in the College. Patients utilized by order of Secretary of the Treasury of United States.

For entrance requirements and full information address DR. T. H. FRAZER, Dean, Mobile, Ala.

ATLANTA RADIUM LABORATORY

929 Candler Building
ATLANTA, GA.

Radium for the treatment of conditions in which the use of radium is indicated.

For particulars address,

COSBY SWANSON, M. D., Medical Director

THE POTTENGER SANATORIUM

MONROVIA, CALIFORNIA

FOR DISEASES OF THE LUNGS AND THROAT

A thoroughly equipped institution for the scientific treatment of tuberculosis. High class accommodations. Ideal all-year-round climate. Surrounded by orange groves and beautiful mountain scenery. Forty-five minutes from Los Angeles. F. M. Pottenger, A.M., M.D., LL.D., Medical Director. J. E. Pottenger, A.B., M.D., Assistant Medical Director and Chief of Laboratory. George H. Evans, M.D., San Francisco, Medical Consultant. For particulars address:

POTTENGER SANATORIUM,
Monrovia, California.

Los Angeles Office: 1100-1101 Title Ins. Bldg., Fifth and Spring Streets.

UNIVERSITY OF MARYLAND, SCHOOL OF MEDICINE
AND
COLLEGE OF PHYSICIANS AND SURGEONS

Requirements for Admission—Two years of college work, including modern languages, Chemistry, Biology and Physics, in addition to an approved four year high school course.

Facilities for Teaching—Abundant laboratory space and equipment. Three large general hospitals absolutely controlled by the faculty and thirteen hospitals devoted to specialties, in which clinical teaching is done.

The next regular session will open October 1, 1919.

For catalogue apply to J. M. H. Rowland, M.D., Dean, N. E. Cor. Lombard and Greene Sts. Baltimore, Md.

LOYOLA POST-GRADUATE SCHOOL OF MEDICINE

New Orleans, La.

Combining New Orleans Post-Graduate School of Medicine.
Louisiana Post-Graduate School of Medicine.

Offers courses in all branches of medicine and surgery.
Special facilities for courses in the Eye, and the Ear. Nose and Throat.
Faculty numbering over eighty. Abundant cadaveric material.
Unlimited clinical material in all the hospitals of New Orleans, the medical metropolis of the South.
Students admitted to all courses throughout the year.

JAMES M. BATCHELOR, M.D., President. **JOSEPH A. DANA, M.D., Secretary.**

Address all Communications to the Secretary, 1533 Tulane Ave., New Orleans, La.

VOMITING of PREGNANCY

and other

OVARIAN DYSFUNCTIONS

have been reported

SUCCESSFULLY TREATED

by

Leading Gynecolcgists

with

LUTEIN—CORPUS LUTEUM—H. W. & D.

of Highest Comparative Potency

Journal Articles Giving Reports on Treatment Sent Upon Request in Reprint Form.

Hynson, Westcott and Dunning

Baltimore

LABORATORY PRODUCTS

Glandular Insufficiency

WHEREVER there is glandular insufficiency, diagnose the case and prescribe the rational treatment, specify ARMOUR'S and get Endocrine Gland Preparations that are dependable.

No "ready-made" medicines will fit all cases. Therefore we are not offering "shot gun" combinations, but depend upon the physician to prescribe Thyroids, Corpus Luteum, Pituitary, Suprarenal, Thymus, Ovarian and other substances in such quantity or combinations as he may consider indicated. We supply tablets containing normal doses of each glandular substance for dispensing.

The Endocrine Gland Products under the Armour label are made from fresh material which is dried in vacuum ovens at low temperature to prevent injury to active principles.

Armour's Surgical Catgut Ligatures, plain and chromic, Emergeny (20 inch) and Regular (60 inch) lengths are smooth, strong, sterile—"just what a ligature should be."

Literature to Physicians on Request

ARMOUR & COMPANY

CHICAGO

5126

SOUTHERN MEDICAL JOURNAL

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

PUBLISHED MONTHLY AT BIRMINGHAM, ALABAMA

Volume XIII APRIL 1920 Number 4

MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

IS SPRUE ENDEMIC IN THE SOUTH?

BY MARK F. BOYD, M.D.,

Laboratory of Bacteriology and Preventive Medicine, Medical Department, University of Texas, Galveston, Tex.

According to the definition given by Castellani and Chalmers in their "Manual of Tropical Medicine,"[1] sprue is a chronic catarrhal inflammation of the alimentary canal of unknown cause, characterized by a peculiar ulcerative condition of the tongue and mouth, and by the passage of large, pale, frothy motions, the symptoms waxing and waning periodically. This definition closely coincides with that given by other authors of texts upon tropical medicine. Stitt[2] calls attention to the "voluminous frothy stools" as being exceedingly characteristic of the disease.

The disease was apparently first recognized by Hillary in Barbados as early as 1766. Since then it has been almost exclusively considered a disease of the tropics, particularly in the orient, thus according to Manson[3] being found in South China, Manila, Cochin China, Java, the Straits Settlements, Ceylon, India, tropical Africa and the West Indies. In the West Indies careful and extensive studies of the disease in Porto Rico have been made by Ashford and his associates. The extreme chronicity of the diarrhea makes it one of the most dreaded diseases among Caucasians residing in the tropics, while it not infrequently persists to the patient's further exhaustion following return to the temperate zone. Sprue patients of this character are not uncommon in the United States. Thus three cases of sprue originating in the tropics have been observed in the medical service of Dr. Graves at the John Sealy Hospital, Galveston. Reports of cases of this character have not infrequently appeared in the literature. This type of patient, in whom infection has been contracted without the United States, is not within the scope of the present paper.

We do desire to submit a little evidence to substantiate the view that this infection is endemic within the southern United States among individuals who have never been outside the country. Dr. E. J. Wood,[4] of Wilmington, N. C., has for some time maintained the view that endemic sprue exists in the South and incidentally has called attention to the fact that sprue may be confused with pellagra, particularly where the skin manifestations of the latter are in abeyance. In his first paper, already cited, Wood calls attention to two series of cases reported as sprue by Graham, of Savannah, and Harris, of Atlanta, but added none to those on record at that time. In a later communication[5] he states that "in North Carolina its occurrence is no longer a medical curiosity." Nevertheless, it can not be said that the recognition of endemic sprue in the South is general, although we are of the opinion that many cases are undoubtedly overlooked.

It will be recalled that the definition quoted stated the disease is of unknown cause. We believe that the careful work

*Read before the Laboratory Section of the American Public Health Association, New Orleans, La., October, 1919. Given by courtesy of the American Journal of Public Health, Boston.

performed in Porto Rico by Ashford has solved this question. Among various views regarding its etiology which have been entertained in the past we may mention the (a) helminthic theory, which ascribed the disease to strongyloides; (b) various bacterial theories; (c) the protozoal hypothesis; and lastly (d) the hyphomycetic theory, which we believe has best support. Kohlbrugge[6] seems to have been the first to observe hyphomycetes in sprue, which he identified as *Monilia albicans*. From 1909 onward a series of observations upon the hyphomycetes observed in Ceylonese sprue were made by Castellani.[7] He concluded that in practically every case of sprue it is possible to demonstrate fungi, which do not all belong to the species *Monilia albicans*. He established, largely by means of fermentative reactions, some twenty-seven species of intestinal monilias, of which six were isolated from the stools, tongue scrapings or saliva of sprue patients. Bahr[8] in later studies of sprue in Ceylon concluded that the pathological findings point to an infection with the thrush fungous (*Monilia albicans*) as being the cause. He found that the yeast-like organisms he isolated gave very inconstant fermentative results and concluded that the classification proposed by Castellani was unjustified and that no specific distinction between the *Monilia albicans* and the yeast organisms found in sprue tissues could be substantiated. Ashford in Porto Rico has extensively investigated sprue in that island. His cultural work is summarized in a paper[9] published in 1917. From 61 of 68 sprue patients he isolated a yeast to which he gave the name of *Monilia psilosis*. In 32 control patients this organism was not encountered. Of the entire 100 persons, 71 gave positive complement fixation tests with an antigen of *Monilia psilosis*. This group of 71 included all of his sprue patients and four of the controls. *Monilia psilosis* is distinguished by the following positive characteristics: it is a large, round yeast from four to seven micra in diameter, with a few granules, a vacuole and a nucleus. It always produces mycelial filaments in cultures, especially in gelatine stabs, in which it produces a typical inverted "pine tree." The articles of hyphae are clear cut, bright and not usually very granular, and are of all sizes, from two to five micra wide and up to one thousand micra in length. Branching is not common. It never acidifies or coagulates litmus milk or liquifies gelatine. On Sabouraud's agar the growth is greenish, creamy, soft and elevated, with clearly defined borders and generally a mycelial extension into the substrate. The only sugars normally fermented are glucose, levulose, and maltose (always), saccharose (often) and galactose (occasionally). Ashford considers fermentation tests of value when applied to the freshly isolated fungus. He[10] found that when freshly isolated this yeast is not sufficiently virulent to kill laboratory animals, but after exaltation, feeding experiments may produce a rapid death with septicemia, or a stomatitis and diarrhoea. Anderson[11] found this yeast in a case of sprue in Illinois which originated in Porto Rico. He observed that non-pathogenic yeasts, when fed to man in mass, pass the alimentary tract in a living condition, but do not gain even a temporary foothold. Using an old culture of *Monilia psilosis*, undoubtedly avirulent, in the same way, he found that it would not cause the disease, but remained in the intestinal tract for about a week. He considers Ashford's organism to be in many respects similar to *Monilia* (*Endomyces*) *albicans*.

The following case appeared in the medical service of Dr. M. L. Graves, Galveston, to whose courtesy we are accorded the privilege of making this report:

Case 1.—Patient, baby W. O., male, age 3½ years. Resident of Glenmore, La., for one year.

Family history: negative.

Past History: eighteen months ago, while residing at Pineland, Tex., he had an attack of "bloody flux," which lasted for two weeks. Prior to this the child had neither been constipated nor diarrhoeic. From five to ten stools were passed daily. These at first contained bright red fluid blood, but later the blood was dark and clotted. The child was confined to bed and had a noticeable fever. His physical and mental condition was apparently unimpaired. The stools were never frothy.

Present Illness: three months prior to admission, the child had a serous discharge from the eyes and nose; he coughed and complained of pain in his legs and feet, but was not confined to bed. On the 4th day he had a temperature of 103° F. and while at the table had an epileptoid seizure. He had several such attacks during the day. A diagnosis of influenza was made by the attending physician. These attacks have subsequently persisted, some being of a markedly greater severity, during which the child would

lose consciousness, while during the lighter attacks equilibrium only would be affected.

One month prior to his admission at Galveston, the child was taken to Kirbyville, Texas, where, because of severe constipation, he was put on a liquid diet. Undigested food was regurgitated. The bowel movements became large, the stools whitish or clay colored, but never sour or offensive. Following stretching of the prepuce, the major convulsive attacks ceased.

During the middle of March the child was brought to Galveston, where it was put on a general diet. In two or three days it developed a diarrhoea with large bulky, putrefactive stools of a grayish or clay color. During this time the only food the child received was that provided by the hospital, save for oranges and crackers. On the trip the only food eaten was brought from Kirbyville.

The mother never observed the tongue to be glazed or red during the last attack of diarrhea, or that he complained of a sore mouth.

	Type 1	Type 2	Type 3
Sabouraud's agar:	Creamy, dull, opaque colonies, elevated round, with a distinct fringe of mycelium extending into substrate.	Creamy, moist, opaque round colonies, not so elevated as No. 1, no mycelial fringe. Growth tends to be scanty.	Similar to No. 2 but colonies appear dull, growth abundant.
Litmus milk	No change	No change	Acid
Lactose peptone water	No change	No change	Acid
Saccharose peptone water	Acid and gas	No change	Acid and gas
Dextrose peptone water	Acid and gas	Acid and gas	Acid and gas
Mannite peptone water	No change	No change	No change
Maltose peptone water	Acid and gas	No change	No change
Levulose peptone water	Acid and gas	Acid	Acid and gas
Galactose peptone water	Acid and gas	Acid	Acid and gas
Starch agar stab	Inverted pine tree	Growth only along stab	Slight inverted tree
Gelatine stab	Inverted pine tree	Growth only along stab	Growth only along stab
Diagnosis	**Monilia psilosis**	Unidentified	Unidentified

During this attack an ulcer was observed on the buccal mucosa near the molar teeth.

The child has never been outside of Louisiana or Texas, neither have his parents or associates been outside the United States. Neither parent gives a history of any past illness remotely suggesting sprue.

Laboratory Examination: on April 7 a specimen of the stool of this patient was received. It was soft and fluid, light yellow in color, filled with numerous gas bubbles, and had an odor similar to that of rising dough.

Smears showed abundant large yeast cells to be present. The stool was plated on the surface of Sabouraud's dextrose agar and on beer wort agar. After forty-eight hours' incubation numerous convex, circular colonies, either dull or glistening, were the preponderating type. Smears showed these to be yeasts. Subcultures were made to Sabouraud's agar slants, on which three types appeared. These three types and the cultural reactions they subsequently gave after replating are given in table above.

Smears made from scrapings of the lingual mucosa showed numerous yeast cells, but plantings of the scrapings on Sabouraud's agar failed to show growth.

It is important that the attack of diarrhoea in this patient bears no relationship to the epileptoid manifestations; in fact, it appears that infection was contracted subsequently to their onset. We believe that clinically the patient has presented the salient features of sprue, which is confirmed by the detection of the specific Monilia in the stools, and that therefore a diagnosis of sprue is justified.

The second case occurred in the service of Dr. C. T. Stone, to whose courtesy we are accorded the privilege of reporting:

Case 2.—Patient, Mrs. E. C. R., female, white, married, housewife, aged 56. A resident of Galveston for several years. Admitted to the Sealy Hospital July 17.

Family History: negative.

Past History: born in Georgia, where she lived until 19, then moved to Alabama for a short time, and finally removed to Texas, where she has since resided. Has never been outside the United States. As a child had "chills and fever," measles and whooping cough. Sixteen years ago she suffered from "stomach trouble" for four weeks.

Present Illness: she complains of nervousness, sore mouth and a run down condition. Six years ago she began to suffer from sore mouth. The gums receded from the teeth and were tender and sore. Last March her teeth were extracted, but although the sockets have healed, she has not secured relief. Since last Christmas she has been very nervous. In the spring she lost considerable weight, but since admission to the hospital she has been gaining. Her loss of weight was associated with attacks of nausea. She denies the existence of any attacks of diarrhoea except those which could be attributed to dietary indiscretions, although her attending physician states that this past summer she experienced an attack of diarrhoea of from three to four weeks' duration, in which the stools were voluminus,pasty and of a clayish color. Has had a nocturnal polyuria.

Physical condition: patient is a bright and well nourished woman, apparently older than her stated age. The skin of the face and forearms is markedly pigmented (freckles), but shows no evidence of a dermatitis. Examination of the head and neck is negative. The tongue is pointed, not coated, rather red and moist. The papillae are clearly distinguished. The patient says it is tender and feels too large for her mouth. On the buccal mucosa about Steno's duct are a num-

ber of yellowish points about one millimeter in diameter. Examination of the abdomen, the gastro-intestinal tract, the respiratory and cardio-vascular systems and her nervous system is negative, while mentally she is subject to melancholia. The red count and hemoglobin are normal.

Clinical diagnosis: a definite diagnosis was not made, but a tentative diagnosis of atypical pellagra, based upon the mouth symptoms, has been entertained, prior to the examination of the stools.

Laboratory examination: a specimen of stool and scrapings from the tongue and cheek were submitted on October 16. Smears were made and the material inoculated upon Sabouraud's agar. The feces were grayish in color, formed and had the characteristic normal fecal odor. A few yeast cells were observed in the fecal smears, but none in the smears from the tongue or cheek. Cultures from the cheek were likewise negative. The fecal plates and tongue cultures showed a few colonies of yeast-like organisms. These were subjected to the cultural tests previously noted and were found to possess all of the characteristics of *Monilia psilosis*. No other yeast-like organisms were present.

We thus conclude that this patient presents an atypical case of sprue. Bahr, in the report previously noted, presents several cases in which the intestinal symptoms were in abeyance, while in addition this case recalls the statement of Wood that in the absence of cutaneous manifestations sprue may be confused with pellagra.

CONCLUSIONS

1. We believe that the evidence advanced by Ashford supporting his view that the specific yeast-like organism (*Monilia psilosis*), which he has reported to be the cause of sprue, appears conclusive.

2. Manifestations suggestive of sprue may be observed in persons who have never been outside the United States, and from these persons Ashford's monilia may be recovered.

3. Sprue, by reason of the disability it produces as observed in the tropics, is of distinct public health importance. Its importance in the southern United States is as yet undetermined. Potentially it may equal hookworm disease or pellagra, so that every effort should be made to ascertain its incidence and present its characteristics to Southern physicians.

4. Our knowledge of its means of transmission is nil, but from the situation in which the organism can be demonstrated, it would appear that measures designed to reduce contact and promote proper excreta disposal might be of value in its control.

BIBLIOGRAPHY

1. Castellani and Chalmers: Manual of Tropical Medicine, 2nd Edition, p. 1325.
2. Stitt: Diagnostics and Treatment of Tropical Diseases, 2nd Edition, p. 286.
3. Manson: Tropical Diseases, 4th Edition, p. 466.
4. Wood, E. J.: "The Occurrence of Sprue in the United States." cl, 692, 1915, Am. Jour. Med. Sci.
5. Wood, E. J.: "The Recognition of Tropical Sprue in the United States." Jour. Am. Med. Ass'n, 73-165, 1919.
6. Kohlbrugge: Ach. f. Schiffs u. Tropen-Hygiene, 1901, No. 12. (Not consulted).
7. Castellani, A.: Jour. Trop. Med. and Hygiene, p. 305. Oct. 1914.
8. Bahr, P. H.: "A Report on Researches on Sprue in Ceylon," Cambridge, 1915.
9. Ashford, B. K.: "The Etiology of Sprue." Am. Jour. Med. Sci. cliv. 1917.
10. Ashford, B. K.: Am. Jour. Med. Sci. cli, 520, 1916.
11. Anderson, H. W.: "Yeast-like Fungi of Human Intestinal Tract." Jour. Infect. Dis. 21, p. 341. 1917.

INDICANURIA (TOXIC STATES) SYMPTOMS, DIAGNOSIS AND TREATMENT*

By W. A. Dearman, M.D.,
Long Beach, Miss.

In attempting to confine my activities in recent years to internal medicine and diagnostic study, it has been my custom first to record a complete history of every individual case who presents itself for examination and treatment, and following this a thorough physical examination is made and all subjective and objective findings are placed in their respective columns on my history sheet. Next, the patient is requested to pass through my laboratory, where a complete blood picture, Wassermann (blood or spinal fluid), urine and feces examination are made and any other laboratory technic is carried out which is deemed necessary in the interest of the case. These findings are also recorded in the history and examination record. "For truly it might be said that the diagnostic study of any case of human sickness is a fruitful field of research activities and forms the basic and fundamental principle for the institution of scientific treatment and advice." It is through this intensive diagnostic study that has led me to an observance of these profoundly toxic states that will be subsequently discussed.

The primary object of this paper is to discuss some of the outstanding and prominent phases of profoundly toxic

*Read in Section on Medicine, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

states of so-called indicanuria due to protein decomposition in the intestinal tract, and to offer some suggestions that are practical to the physician who may be in the remotest rural community. Not until recently have toxic states due to this etiologic factor found a place in current medical literature. Text-books dismiss the situation with a definition of indicanuria with the most practical tests to discover it, but nowhere have I been able to find any satisfactory chapter devoted to the symptomatology, diagnosis and treatment of this most distressing condition.

In order to avoid going into technical details I shall confine my discussion to intestinal indicanuria, with a brief summary of the most prominent symptoms, its diagnosis and treatment.

Indicanuria might be defined as a protein decomposition in the intestinal canal and the liberation of a very violent toxin which is absorbed and gives rise to a more or less "symptom complex." However, there are certain definite, classical and cardinal symptoms which are always associated with this condition and should not escape the observation of the diagnostician. In the study of 50 selected cases the principal symptoms are as follows: languor, lassitude, fatigue, pain in back of the neck (cardinal sign), pain radiating down the spine (cardinal sign), vertigo, headache (continuous or intermittent), dyspnea on exertion, insomnia, anorexia, sensitiveness to cold, vaso-motor disturbances (cold, clammy skin), amblyopia and other occular disturbances, chilliness, acute and continuous febrile movements, loss of weight, no capacity for work, nausea and vomiting, marked depression, train of nervous symptoms, anxious state, hypotension (usually the rule), leukopenia and in the majority of cases, muscular soreness.

In entering into a discussion of the etiologic factors of indicanuria I shall briefly state that any condition altering the epithelium of the intestine, such as chronic amebic dysentery, vegetative or cystic type, chronic bacillary dysentery, or simple ulceration, will predispose to this condition. Deficient gall-bladder drainage and altered pancreatic function associated with gastro-duodenitis are often the underlying etiologic factors. Hypoacidity is responsible in many cases as much as focal infections in producing a toxin which is capable of inhibiting the normal peristaltic wave. Excessive purgation, excessive protein intake, overwork and lack of diversion and recreation are responsible in some cases. There is unquestionably a type of intestinal toxemia which might be classed as "indicanuria sine indicanuria," and it is quite possible for protein decomposition to become initiated without any assignable cause aside from a simple primary extensive protein breakdown due to bacterial activity (putrefactive bacteria). The formation of toxins seems to take place in the lower part of the small intestine and colon and the remote effects of these toxic states on the myocardium, arteries, kidneys, liver and other organs, can not be over-estimated. Constipation *per se* does not seem to cause indicanuria.

The nervous symptoms due to the absorption of putrid protein products are familiar to nearly all clinicians and always stand out prominently in the clinical picture.

Indicanuria and profoundly toxic states are not always confined to adult life. The same situation obtains in children to a surprising degree, and the train of symptoms that mark the clinical progress of the case is likely to be overlooked and never recognized until a thorough examination of the urine is made, especially for indican. This is too often omitted by the general practitioner and most skilled physicians and chemists.

The successful treatment and management of invalids, paralytics, the insane, the cardiopathies and nephropathies as well as other chronic conditions, is often enhanced and a very violent toxemia relieved when aside from their general state a profound indicanuria is discovered and scientifically treated.

The diagnosis of indicanuria depends upon the recognition of a symptom complex as well as a few outstanding cardinal or specific symptoms which are as a rule always present and associated with the condition coupled with a thorough examination of the urine, and in this examination a test for indican must not be omitted. Inquiry should always be made prior to the urine examination if a purgative has been taken the day before, as this

will usually sweep out of the intestinal tract most of the putrefying protein material and give a negative reaction due to a lack of resorption.

There are several reliable, simple and practical tests for indican that can be employed by those who are not familiar with ordinary laboratory technic. The one that I have employed and have found satisfactory is as follows: in a clean test tube are placed equal quantities of chemically pure hydrochloric acid and urine which are thoroughly mixed by inverting the tube several times. Next a few drops of Labarraque's solution are added and the tube is again well shaken. Now add a small quantity of chloroform and again mix well; set aside for a few minutes, and the chloroform will settle to the bottom of the tube and carry down with it the indigo blue color which marks the end reaction of the indican test. I have here for your consideration a graphic description of the various deposits of indican which will usually be observed in routine examinations of the urine.

The urine in profound intestinal toxemia is as a rule highly colored, dark amber. However, this should not deter one in making an investigation even in a perfectly clear urine, as surprising results are likely to be observed after the test is completed.

The treatment of indicanuria simplex is mostly dietetic. However, there are other valuable suggestions to be offered in the solution of the problem. Primarily, the intestinal tract should be cleared of all putrefying protein material by the initial administration of a purgative, and the most suitable in my hands has been calomel gr. iii, phenolphthalein and pulverized rhei aa grs. vi, made into three capsules and given every two hours commencing usually in the late afternoon.

The patient should be given a written diet list consisting of the following: soups, all clear soups, vegetable broths, puree of corn, beans, peas, asparagus, spinach, celery, onions, potatoes and tomatoes. Eggs, none. Fish, shrimp, oysters, crabs and lobsters, none. Meat, game or poultry, none. Cheese, ice cream and milk, none. The patient may take farinaceous foods as oatmeal, rice, sage, hominy, grits, cracked wheat, whole wheat bread or biscuits, corn, rye and Graham bread, rolls, dry and buttered toast, crackers, muffins, waffles, pan cakes, wafers, grape nuts, macaroni, noodles and spaghetti. Vegetables such as potatoes (sweet or Irish) any style, green peas, string beans, beets, carrots, celery, spinach, artichokes, alligator pears, eggplants, lettuce and onions. All vegetables except cabbage, cauliflower and turnips. Desserts: rice and sago with a little cream and sugar, figs, raisins, nuts, syrup, jams, and jellies; marmalades and gelatin, prunes, apples, and pears, either raw or cooked. Drinks: tea and coffee (with cream but not milk), grape juice, orangeade and lemonade, limeade and Vichy. An abundance of pure water, cold or hot, and cocoa. Must not take veal, pork, steak, goose, duck; salted, dry, potted or preserved fish or meat (except crisp breakfast bacon), oysters, crabs, salmon, lobster, shrimp or mackerel, eggs, turtle and ox-tail soup, gumbo, patties, mushrooms, mince pie, cabbage, cauliflower or turnips and cheese.

In conjunction with the prescribed diet list, the patient is given Bulgaria bacilli in some form, and I usually employ a preparation known as Cultol, which is Bulgaria bacilli incorporated in refined mineral oil. It is pinkish in color and has the consistency of jelly. The bacilli seem to multiply in this medium and the mineral oil overcomes constipation. If the individual is not constipated I employ as a substitute the Bulgaria tablets. Either preparation should be administered one-half to one hour before meals. The addition of a teaspoonful of sugar of milk to the dissolved tablets enhances its therapeutic effect. Care should be exercised in prescribing Bulgaria tablets, as it has been shown in former times that some have been found not to be viable.

The general habits of the individual should be gone into, and rest, sleep and recreation advised, and when hypotension and general weakness are prominent, tincture of nux vomica in large doses should be given after meals as much as twenty to thirty minims three times a day.

After two or three weeks, if the patient is indican-free, a more liberal diet list can be prescribed, which will consist of more protein food, but in a limited quantity. Light broths and oyster broth with boiled

fish, the soft part of raw oysters, tender lean mutton, lamb, chicken, brains and sweetbreads (all sparingly) may be aded to the list.

One or two brief case histories will serve to emphasize the importance of recognizing the symptoms of intestinal toxemia, and in making a diagnosis and instituting early an appropriate treatment.

CASE REPORTS

Case 1.—A male, age 32, white, occupation banker, married, several children, had lived in Mississippi and Louisiana all his life and had excellent habits. He had had the usual diseases incidental to childhood. Eight months previously he had commenced to have dizzy spells, violent headaches with nausea and vomiting coming on two or three times a week, appetite poor, constipated, tachycardia, insomnia, very nervous and was under the phobia that something disastrous was going to happen to him. He showed marked loss in weight, had pains in the back of the neck and persistent backache. Physical examination did not reveal anything of importance aside from slight enlargement of the liver. His reflexes were normal. Systolic pressure was 100 mm. and the diastolic 75 mm.; differential count, N. 53; S. L., 31; L. L., 15; Eo., 1; Bas., 0. Red count, 5,000,000. Total count, 7,000. Malaria negative; Hb., 80 %; C.I., 8. Wassermann negative. Urine normal except that it was loaded with indican and showed a heavy bile ring.

Diagnosis: indicanuria, highly toxic state.

Treatment was as I have already outlined.

Clinical course: the patient had gained twelve pounds in two weeks, was sleeping well; all pains relieved in his neck and back; bowels were regular. There was a complete cessation of all nervous phenomena; he possessed a full capacity for work; his systolic blood pressure was 115 mm. and the diastolic 85 mm. He was dismissed at the end of eight weeks with instructions as to diet, recreation and exercise, and has continued to improve. He gave a history of having been treated for malaria and had been taking ten grains of quinine sulphate every night for about three weeks with no benefit.

Case 2.—Girl, age 12, white, from intelligent family, attending school. For one year she had complained of headaches which were attributed to eye strain. Glasses were fitted with no relief. She had marked dizziness, poor appetite, dyspnea on exertion, regular bowels and was very nervous. Physical examination was negative except for some emaciation. Systolic pressure 95 mm., and diastolic 65 mm. She was being treated for chronic malaria by the internal administration of quinine sulphate. Blood examination showed N. 48; S. L., 34; L. L., 14; E., 4; Bas., 0. Total count, 7,250. Reds, 4,750,000; Hb., 80 %; C. I., 8. Malaria negative. Feces for ova negative. Wassermann negative. Urine was normal, except that it was loaded with indican.

I diagnosed indicanuria with toxic headaches.

Treatment was given as already outlined.

Results, no more headaches; nervousness completely subsided; dizziness and dyspnea were both relieved and there was a full capacity for school life and its duties. For a period of six months she has had no trouble whatsoever.

I am indebted to Dr. Allen Eustis, of New Orleans, for a copy of the low protein diet list which I use in the treatment of profoundly toxic states arising from the intestinal tract known as, and expressed in terms of, indicanuria.

DISCUSSION

Dr. Allan Eustis, New Orleans, La.—A convert is often the most radical of any class, and I recall the circumstances which converted my friend, Dr. Dearman, to a realization of the importance of indican in the urine. He had been in attendance on several cases of epidemic meningitis, so that when he began to feel a severe pain in the occipital region, he naturally thought that he had meningitis. It was necessary for me to travel about eighty miles to persuade him that he was not a victim of this dreaded disease, but was suffering from intestinal toxemia. As he says, the post-cervical neuralgia is one of the most constant symptoms and I am gratified that he has called the attention of this Section to the subject of intestinal toxemia. However, I would caution him not to be too radical, as there are no doubt many cases of excessive indicanuria showing no symptoms whatever. For this reason, many excellent clinicians have ceased even to test the urine for indican, much less attribute any importance to its presence. Due to recent investigations, we now know why this happens and the whole question of intestinal toxemia is today based upon sound scientific facts. We know that for the most part these toxins are amins or alkaloids, analogous to the alkaloids of the vegetable kingdom; that they are formed from the several amino acids by the latter splitting off one atom of carbon dioxid under the influence of putrefactive bacteria; and further, that each amin has its own specific physiological action just as the vegetable alkaloids have. We know, further, that the liver has the power of detoxicating these several amins and that indican is an example of this toxic indol, being oxidized to non-toxic potassium indoxyl sulfate or indican.

Dale has shown that tyramin or paraoxyphenylethylamin, which arises from the putrefaction of tyrosin, when perfused through the healthy liver of the dog, is broken up into urea and phenyl acetic acid. This amin is capable of raising arterial tension markedly. Histamin, or betaimidazolylethylamin, is formed from the putrefaction of histidin, another of the normal amino acids, and its physiological action consists in stimulation of unstriped muscle fibres, notably in the uterus and bronchioles, with a fall in arterial blood pressure. The relation of this amin to asthma was mentioned before this Section at the Dallas meeting. From experiments with this amin, the results of which I published in the *Biochemical Bulletin*, it can be stated positively that the liver of the ordinary turkey buzzard has the power of rendering solutions of the

amin absolutely inert from physiological action. It is, therefore, easily understood why a mixture of variously acting alkaloids will present a varied symptomatology, while in those individuals with livers as active as that of the turkey buzzard, there may be no symptoms at all.

Regarding indicanuria, so to speak, which I do not regard as a disease but as a condition, I am firmly of the opinion that it is a very reliable index of the amount of putrefaction of protein in the body, as a rule in the intestinal canal, but at times from abscess in the lung, liver, alveolar process or even peri-renal tissues, should these latter be infected with saprophytic bacteria. Its greatest importance is as a guide in the dietetic management of typhoid fever, nephritis and other diseases in which the diet is the dominant factor in treatment. It is appalling to me to visit some of our most modern hospitals and see records of cases of nephritis, beautifully kept as to albumin and chlorid output, renal function tests, and blood creatinin and urea zealously watched, with no mention of indican. At the Atlanta meeting of this Association I gave the results of some experiments which showed that nephritis could be produced experimentally in rabbits by the injection of sterile extract of feces. I can state most positively that intestinal toxins do irritate the kidney and the succ sstul management of a case of nephritis can not be accomplished unless frequent examination of the urine for indican is made.

In discussing Dr. Barker's paper, "On the Treatment of Typhoid Fever," at a recent meeting of the American Medical Association, I maintained that the dry coated tongue and tympanites set down in text-books as symptoms of this disease are really symptoms of intestinal toxemia. In typhoid fever, owing to local paresis in the cecum and terminal ileum, there is a particular tendency to intestinal stasis. The tendency to add intestinal toxemia to the specific toxemia of the Bacillus typhosus augments the severity of all symptoms, but especially the coated tongue and tympanites. If careful regulation of the diet of the typhoid fever patient is controlled by daily examination of the urine for indican, it is possible to carry the average case through his three weeks of fever without any tympanites and with a moist, clean tongue. Most of us make the mistake of giving too much milk and eggs to our typhoid cases. Carbohydrates should form the bulk of the patient's diet.

I have been particularly interested in intestinal toxemia for the past twenty years and the longer that I work at these cases the more convinced I am that the average clinician is daily overlooking a very important field of medicine.

Dr. Arthur A. Herold, Shreveport, La.—Dr. Dearman did not say anything about the cases with acute toxemia which we often see with hypertension. For instance, a patient comes to you with an increased systolic pressure and the only thing I can find is possibly an autointoxication. I find the urine loaded with indican, probably an acute condition. By putting the patient under appropriate treatment, not alone does the indicanuria clear up, but there is a lowering of the blood pressure.

Dr. Dearman (closing)—In answer to Dr. Herold's question I would like to say that I made the statement that hypotension was the rule. I have seen quite a few intestinal toxemias with hypertension. I have seen other toxic states associated with hypertension. The majority of my patients have been flabby people, with their muscular tone gone, their cardiovascular tone being at a low ebb.

You will excuse me for making a personal reference. My systolic pressure went down to 90, and I have 115 now. It nearly dealt me a death blow. I was the most toxic individual you ever saw. I was so toxic that I was passing red blood cells through my kidneys, and I feel the effects of that terrible attack of intestinal toxemia to this day. I reduced in weight from 150 to 112 pounds.

CARDIOSPASM, WITH REPORT OF ONE HUNDRED CASES*

By J. Russell Verbrycke, Jr., M.D.,
Washington, D. C.

Cardiospasm is an abnormal spasmodic contraction of the lower esophagus. The symptoms of cardiospasm were recognized and described as early as the eighteenth century by Frederick Hoffman and Everard Howe and others, although the causation of the symptom-complex was not known. Mickulicz attributed the condition to contraction of the cardia in 1882 and his view was proven by S. J. Meltzer.

Until 1908 comparatively few cases had been reported, well under 200, when Plummer reported 40 cases coming under his personal observation. This proved that the condition is not so uncommon, but that it had been rarely recognized as such. Since that time the diagnosis has been made much more frequently and the literature has become voluminous, so that the cases probably now run into the thousands. However, I find in conversation with physicians that many have not only never seen, or at least recognized, a case of cardiospasm, but frankly confess that they have never heard of the condition.

Having had the opportunity of studying and treating quite a large number of cases, I have thought it well to analyze and present them. My cases to date run

*Read in Section on Medicine, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

between 110 and 125, but for round numbers I have chosen 100 for this series.

ETIOLOGY

The actual cause of the spasm still remains obscure and there are apparent discrepancies in different explanations of the mechanism. It is generally agreed now that the spasm is practically always primary to the dilatation of the esophagus above it, and although in some cases the dilatation occurs very soon, it probably never precedes the cardiospasm.

The spasm habit must undoubtedly have its inception in the nervous system, though later the muscle may become so hypertrophied from overuse as to be able to stay contracted independent of the nervous system. The vagus supplies both the esophagus and the cardiac sphincter, but its action on each is different. Stimulation of the vagus causes increased peristalsis of the esophagus, but the sphincter is relaxed probably through sympathetic fibers running in the vagus; section of the vagus causes marked contraction of the cardia. It would seem, therefore, as if a weakened function of the vagus would readily account for the symptom-complex of cardiospasm. However, clinically, this does not seem to be the case, as 21 cases in my series showed distinct evidence of the opposite condition, or vagatonia, with such manifestations as colonspasm, intensely hypertonic stomach and even secondary slighter spasm of the esophagus itself, generally near the cricoid. I can not, therefore, think that lowered vagus tone causes cardiospasm, but rather the opposite; that the sympathetic fibers of the vagus supplying the cardia are at fault.

While we are still uncertain as to the exact mechanism which stimulates the muscle, we do know certain predisposing factors which operate in many cases. In others, no such probable cause can be found, and we are compelled for the present to call the condition idiopathic.

Sex.—Sex does not seem to be very important. There were 39 males and 61 females in this series.

Age Incidence.—The disease would appear to be one principally of middle age, over 50 % appearing between the ages of thirty and fifty, 20 were in the third decade, 28 in the fourth, 35 in the fifth, 12 in the sixth, and 15 between sixty and eighty.

Types of Causes.—A search for the probable cause and co-existing conditions in my 100 cases shows that there are probably four main groups of causes of cardiospasm: (1) neurotic, mental and psychic, (2) reflex, (3) irritative, and (4) toxic.

Neurotic, nervous and psychic cases: When questioned as to their temperament, 20 stated that they were not nervous, while the balance admitted varying degrees of nervousness. I feel that this is relatively unimportant and not very different from the usual relationship of nervousness to any gastro-intestinal disturbance, as a large proportion of all digestive cases are nervous, even such organic conditions as ulcer, gall-bladder disease, etc.

However, 3 patients traced the beginning of their trouble to a severe nerve strain as a sudden death in the family. One officer in the Army first had trouble when in France after hard work and probable worry at being separated from his family. Four thought the disease due to nerve strain and overwork. I have no doubt that some of the other patients had various disturbances of the subconscious mind with resultant physical manifestation in the spasm, although none of my series were given psychoanalysis to prove this.

Reflex Causes.—It has long been known that pylorospasm may be a reflex induced by organic disease elsewhere, but it is not as generally recognized that cardiospasm alone or in conjunction with pylorospasm may be so caused. Disease in other organs does account for a great many of the cases of cardiospasm; although after the spasm is once firmly established removal of the primary cause does not cure, as the spasm habit and hypertrophy are sufficient to continue the trouble. Twenty-four of this series had disease of the appendix, gall-bladder, etc. Eight had or were suspected of having ulcer of the stomach. Ten had chronic tonsillitis and certainly in three cases the tonsils seemed to be the cause. There were other patients who had intestinal adhesions, cancer and other troubles which might have served as a focus of reflex irritation of the cardia. Five of the patients had concomitant pylorospasm and 2 had esophageal spasm.

Irritative Causes. — Local irritation

probably accounts for the smallest number of cases. There were 3 cases of probable fissure or ulcer of the cardia and one diverticulum. One patient drank a glass of cold water and her trouble had been constant since. Another swallowed a piece of hard meat. In these instances, however, it is possible that the first stage had been developed already and that these factors only called the patients' attention to the condition.

Toxic Causes.—I don't think that I have ever heard it suggested that various intoxications acting through the nervous system can initiate cardiospasm, and yet I believe that poisoning is one of the greatest causes of so-called idiopathic cardiospasm. Four of this series dated their trouble from an attack of influenza and there were also 4 cases of hyperthyroidism, but the most interesting fact is that 28 showed evidence in symptoms and signs of intestinal autointoxication.

COURSE OF THE DISEASE

The course of the disease is rather variable. The average duration in my series was 2 years and 2 months, the extremes being several weeks to 40 years. Some cases have intermittent attacks at long intervals. One patient had only one or two attacks a year of absolute obstruction, lasting a few hours and extending over a period of thirty years. Others have almost a periodicity of attacks with trouble lasting a few weeks, and then free intervals; but the largest number always have some trouble, worse at times than others. Some for months are not able to eat a meal in comfort.

Plummer and others have described three stages to the disease. In the first stage, there is some obstruction to food entering the stomach, but the esophagus is able to force it through. In the second stage, there is an actual or relative increase in the spasm, so that the esophageal muscle can not always force food through and regurgitation occurs. The third stage is characterized by dilatation of the esophagus and food retention.

Inasmuch as many patients have regurgitation with very slight degrees of spasm and some others in whom the disease has progressed until there is great dilatation of the esophagus rarely regurgitate it is difficult to make an exact classification. I have endeavored to divide my cases rather arbitrarily into three stages also, but have left regurgitation out of the question, grouping according to the amount of the spasm and dilatation as nearly as we are able to gauge it.

I have grouped as first stage those in whom there is transient or slight obstruction; second stage, those with decided obstruction but no dilatation; and third stage, those with dilatation of the esophagus above the spasm. There were 47 first stage, 35 second stage, and 18 third stage cases.

The stages naturally overlap and the gradation is not marked. Also a first stage case may have actually much more symptomatology than a third stage patient. Again some patients take many months to go through the three stages, while others seem to go almost from the first into the third stage.

It is important from the standpoint of prognosis and treatment to know whether or not the third stage has been entered upon.

SYMPTOMATOLOGY

The symptomatology is variable, although there are of course typical cases which are recognizable as probable cardiospasm after several minutes' conversation with the patient. Some patients, in fact, have diagnosed their own case correctly before coming to the physician.

Dysphagia.—Dysphagia is the most common symptom. However, 25 of this series had no pain and 9 others occasional, slight or indefinite pain only. The other 66 had various kinds and degrees of pain, as pain in the chest and under the xyphoid in 25, pressure under xyphoid in 7, discomfort and distress in 5, burning down sternum 5, angina pectoris 3, stuffy feeling about the heart 4, pain in heart relieved by vomiting 1, pain in chest and between shoulders 3, between shoulder blades only 3, and epigastric 4.

Some had pain while eating and some shortly after. In some the pain persisted until regurgitation occurred, one until she belched; in others, it wore off gradually, and in one it was continuous, a rather unusual case. Another out of the ordinary finding was 2 patients who had painful contraction of the cardia when the stomach was empty, causing also a dyspnea.

Of special interest are the angina cases

which were typical and yet which could not be connected with the heart. In this connection I might state that I have in three patients noted the most severe angina radiating into the left arm from passage of the stomach tube, it never having occurred previously. Also if the patient should have pain during the operation of dilating the cardia, it is apt to be of this type, so that there must be some mechanism connected with the esophagus capable of causing typical angina.

The stage has apparently little effect on pain. Of the 25 cases with no pain, 15 were first stage, 6 second stage, and 4 third stage. The third stage cases were severe, one of them being fatal.

Sticking of Food.—The sensation of food sticking at the cardia, whether or not there is pain, is another symptom. Thirty-four of this series were not conscious of any obstruction. In 9 it was described as slight or occasional. Four did not know. The rest complained of food or liquid sticking, 5 complained of liquids only. On the other hand, 3 had to force food into the stomach by drinking liquids after eating.

Like pain, so also the sensation of food sticking is not necessarily dependent upon the stage of the disease. Some had recognized for themselves the mechanism, while others had not thought of an obstruction, but thought that they had heart trouble. Some tried various maneuvers to force food through the cardia, others ate very slowly, some forced food down by drinking water and many had reduced the diet greatly.

Regurgitation and Vomiting.—The average patient will not distinguish between regurgitation and vomiting, so they are considered together. In this series 27 did not regurgitate, 23 did occasionally, 40 more markedly, 3 brought up liquids only, 3 forced food up and 1 coughed food back.

Of the 18 cases with dilatation of the esophagus, 11 brought food up frequently, 4 at times, 1 forced it, and 2 never regurgitated.

In some patients who have frequent vomiting it is easy to see two types. At times the food comes up very soon after swallowing, this being due to cardiospasm. At other times they will retain nourishment for some hours and then vomit. Usually this is due to pylorospasm, sometimes one occurring and sometimes the other.

Most cases of cardiospasm show a great deal of mucus with the regurgitated material. The food may be as swallowed or may be admixed with gastric juice which has regurgitated into the esophagus from the stomach. More often solid food sticks at the cardia and regurgitates, but occasionally thin liquids only will come up. This, when it does occur, is very suggestive of cardiospasm. The liquid causes spasm because of the relative speed with which it reaches the cardia, surprising it, as it were, so that it clamps shut. One of my Russian Jewish patients expressed it well in broken English: "Solid food goes all right down, but water goes down and up it comes like little devils."

Belching.—Belching is such a common symptom with all digestive troubles as to be rather unimportant. Fifty-three patients belched a good deal, 23 slightly, 2 forced belching, and 2 could not belch. The inability to belch is a rather suggestive symptom of spasmodic contraction. Of course belching and air swallowing are largely dependent on the action of the cardia. In some patients I have recognized that food stopped at the cardia until a belch occurred, after which it would drop into the stomach.

Weight.—Some loss of weight was the usual thing. It varied from no loss to a loss of 50 pounds in a year. Some of my last stage cases were really pitiable from starvation when I first saw them.

OBJECTIVE SIGNS

Although the symptoms may be most suggestive, we naturally want objective evidence in making the diagnosis. The signs are three: (1) swallowing sound delayed or absent, (2) obstruction to the stomach tube or bougie, and (3) x-ray evidence. In the majority of cases all three of these methods show the spasm to be present, but none are infallible except in the third stage, as will be shown later.

Swallowing Sounds. — The swallowing sound is heard with the stethoscope applied just below the xyphoid, as the cardia relaxes and a mouthful of water drops into the stomach. Normally the swallowing sound is heard about 8 seconds after the patient swallows. In any obstruction the sound is delayed or absent. In these

100 patients it was tried in 66 only; it was normal in but 14, slightly delayed in 19, markedly delayed in 10, even up to twenty to thirty seconds, and doubtful or not heard at all in 23. In some, the sound was delayed and water could be heard trickling in as if through a very narrow opening.

It has been noted that the first swallow may go in rather promptly and subsequent swallows be much delayed; therefore I always try it several times. A positive delay in swallowing sounds is very good evidence of obstruction which is more often due to spasm than anything else. A normal swallowing sound, on the other hand, is not good evidence of the absence of spasm, as the cardia relaxes in these cases to liquids, but not to solids.

Obstruction to the Stomach Tube.—In 96 the tube was tried and in 4 not. In only 10 did it appear to enter the stomach freely. The other 86 had obstruction varying from resistance to impossible obstruction. Several times the tube entered the cardia, but was so firmly grasped as to cause it to stretch on withdrawal. In 2 the tube caused considerable pain and in 2 blood was brought away.

In 3 bougies were also tried and met with obstruction. Some text books state that bougies should be used to differentiate spasm and organic disease and that in spasm the tube will be obstructed, but the bougie will freely enter the stomach. I do not agree with this and am convinced that a spasm of any severity will block the entrance of the bougie also, and I would condemn the use of force in trying to pass the bougie in such a case unless it is threaded on silk. My principal use for the bougie is where the tube has apparently not entered the stomach, and I am afraid that the tube has become a little too flexible and has bent.

The obstruction to the stomach tube is absolutely the best diagnostic sign for a first stage and some second stage spasms. I bar not even the x-ray, which, as I shall show, misses some cases.

X-Ray.—The use of the radiograph, and especially the fluoroscope, is indispensable in this work, principally for the differential diagnosis, and to determine the stage and degree of the spasm and dilatation.

In this series the x-ray was not used in 29 of the milder cases because of the expense and the absence of positive need for it. Thirty-one showed obstruction to buttermilk without dilatation, 18 showed obstruction with dilatation, 4 showed free entrance of liquid, but obstruction to a thicker paste. Eighteen were negative. In 5 pylorospasm was evident, and in 1 another spasm of the esophagus opposite the arch of the aorta.

The 18 negative reports may be explained in two ways. First, an intermittent spasm may have relaxed. Second—and I think this covers the majority of cases, the esophagus was not properly studied, as attention to it was not especially requested. If we send a patient to the radiographer and request a gastrointestinal study, he gives thin buttermilk and barium and not the thicker paste unless we have reason to suspect the cardia and request a special examination. In this way many cases, even second stages, are missed by the x-ray. The clinician should have some idea of what he expects to find when he sends a patient to the x-ray laboratory and requests special attention to the suspected part.

I remember one patient who came back recently from the radiographer with a negative report. Having passed the stomach tube and met an obstruction, and having withdrawn some offensive bloody mucopurulent material from the esophagus, I went with the patient to the radiographer and requested another fluoroscopic study of the esophagus. There was then revealed an esophageal diverticulum and first stage cardiospasm.

In another of the negative x-ray cases the spasm was absolute part of the time and so tight that it took great force to enter the small tip of the cardiac dilator into the spasm.

I consider the x-ray is, therefore, inferior to other methods in the picking up of all of the cardiospasm cases, but it is indispensible for ruling out other conditions as cancer, tuberculosis with enlarged glands or abscess about the esophagus, cicatricial contraction, mediastinal tumor, aneurism, etc. It is also necessary to determine by the x-ray whether or not there is dilatation of the esophagus and the degree.

PROGNOSIS

I know of no condition which I would rather treat than cardiospasm because of

the sure results and the speed with which cure may be accomplished. I have not always felt thus. I used to see a bad case with dread and a feeling of hopelessness. Now I would rather treat a third stage case than a first, for the greater the trouble previously experienced the more the patient notices the change when relieved, and he can be relieved in a few minutes.

With proper treatment any stage is speedily curable. Without treatment or the right treatment the prognosis for cure is gloomy and life in some third stage cases is seriously endangered.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis consists in ruling out certain other troubles as diverticulum, cancer, peptic ulcer, mediastinal tumor, aneurysm, tuberculous trouble and other conditions. Space will not permit of consideration of these in detail.

TREATMENT

Treatment is medical, mechanical and surgical. Most first stage cases and some second stage cases are relieved by medical treatment or removal of the cause without local treatment to the cardia. The cause, when determined, should, of course, be removed. Mild or transient spasms of not too long duration often cease without further treatment when the cause is removed, be it nervous, reflex, irritative or toxic.

All irritating food, whether from mechanical, thermal or chemical standpoint, should be avoided. One of my patients, a pronounced second stage case, cured himself, at least for the time being, by eating more slowly and chewing his food more slowly. He had noticed for some months typical symptoms whenever he ate coarse food. I was called for acute distress caused by his swallowing a large piece of meat which had stuck at the cardia and refused to go either way. It was removed by passing a stomach tube to the cardia and aspirating, which caused the meat to be drawn against the stomach tube until it could be pulled up. Fluoroscopic examination showed considerable retention even of thin liquids. He refused further treatment at the time, but took great care in eating with the result that after only three weeks' time another x-ray examination showed all evidence of cardiospasm to have disappeared.

In addition to the diet certain measures looking toward building up the general health and thereby the autonomic nervous system should be employed, as regulation of rest and exercise, mental and physical habits and baths.

In the way of drugs, mineral oil before meals to lubricate the passage is useful. Belladona pushed to the physiological limit is very valuable in general vagotonic cases, but is disappointing in so-called idiopathic cardiospasm without other manifestation of vagus irritability. I have hopes for the new antispasmodic, benzyl benzoate, but have not had sufficient experience with it yet to form conclusions. Silver nitrate is useful if any fissure or abrasion is suspected.

Mechanical Treatment. — Mechanical treatment is indicated for practically all severe cases. It consists in forcibly overstretching the spastic muscle. To do this various things have been recommended as the passage of bougies, expanding metal blade instruments as Einhorn's, air pressure dilators and water pressure dilators.

One of my patients was cured by getting a stiff stomach tube to enter the stomach; this, he insists, saved his life. Such relief is, however, most unusual. Anything short of overstretching the muscle generally results in irritating the spasm to greater contraction rather than relieving it.

For the above reason the passage of olive bougies in increasing sizes is generally entirely ineffectual, the largest olive being much too small to do good. Case 19 I treated before I had other means. He was a bad third stage case. Olives were passed on a thread guide and after each treatment the spasm closed down more firmly than ever. He was unimproved and lost sight of. I do not approve of the use of the bougies, but if they are used it should always be with the thread guide.

The Einhorn instrument I have tried to use in only one case. Compared to the Plummer instrument, it is almost barbarous and infinitely harder both for the physician and patient.

The method of treatment upon which I wish to dwell is the mechanical dilatation with the Plummer water pressure dilator, some such apparatus being necessary in the severe cases if we expect to effect a cure. As I have before stated, I used to

dread seeing these cases until about eighteen months ago, when I began to use this apparatus. During this time I have used it on 18 patients. In one other it was not possible to get the thread through the cardia so that he could not be treated, and in spite of a gastrostomy he died from exhaustion and starvation acidosis. In another, who had cancer of the pancreas and cardiospasm, I had trouble in getting the instrument to pass along the thread, probably because of a knot, and because of his very poor condition did not go on with the operation.

Of the 18 patients, 13 were cured with one dilatation; 2 were temporarily relieved but should have had a repetition; 1 was not very successfully done and refused further treatment; 1 was dilatated three times with permanent cure and 1 was treated six times with cure and a gain of over 50 pounds. This makes a total of 15 cures, 2 improved, 1 unimproved and no deaths.

The amount of water pressure varied from 6 pounds up to 30. The higher pressures are probably not necessary and are more dangerous, but we can not expect a cure if the patient can not stand at least 8 to 10 pounds. No matter how little pressure is registered if the patient experiences pain the pressure is immediately lowered, as there would be danger of rupture of the esophagus.

The throat was cocainized in all but 2 instances. It is difficult to get satisfactory anesthesia and I am not sure but that it is as easy without the anesthesia. At best it is not a pleasant ordeal, but the relief afforded almost instantly repays the patient.

There are a few points which might be mentioned. Cases of food retention should have the esophagus washed before the dilatation to prevent aspiration.

One must be sure that the rubber bag is engaged in the cardia if good is to be accomplished. It is well to place a mark on the tube at about 44 cm. from the middle of the bag. In the average case the dilator will be in the correct position when this mark is at the teeth. The exact position of the spasm can be determined in each case, however, by passing a stomach tube to the obstruction and then measuring the distance. Then also, when the tip of the dilator meets the obstruction, it can be plainly felt, and if the instrument is pushed down three inches farther it will be in the correct position. When the bag is filled with water there is a strong tendency for it to be drawn into the stomach if it is in the spasm, so that the tube must be very firmly held with one hand at the patient's teeth. If this pulling sensation is not felt, there is considerable doubt as to the dilator being right in the muscle.

Any traction upward may pull on the stomach with the same effect as traction on the mesentery, namely, sickening pain and shock.

When the dilator is *in situ* and filled with water each heart beat can be forcibly felt against it. This phenomenon is apt to be rather disquieting unless one knows that it is a constant thing.

Blood is often present on the rubber bag when it is withdrawn. This is not cause for alarm.

Some of my friends in the specialty condemn the method and insist that I will have a fatality with the instrument some time. Fatalities have occurred. I know of one in New York and another in Philadelphia, but I believe that they are explained by wrong diagnosis, poor selection of the cases or poor technic. The fatal case in New York turned out to be a tubercular abscess surrounding the esophagus which was ruptured by the dilatation. Naturally this case should have been correctly diagnosed by the radiograph and dilatation never attempted, so that the operation can not be condemned in this instance.

Cancer of the esophagus and cardia should be ruled out, as attempted dilatation might result in serious hemorrhage and traumatism. There are other contraindications. I have refused to dilate several cases with aneurysm, with arteriosclerosis and high blood pressure and serious heart trouble.

However, I would not hesitate to dilate one of these patients cautiously if there were marked dilatation, food retention and regurgitation so that life might be endangered more by the disease than by the operation.

The following is one of the doubtful cases:

Mrs. K., aged 60, had severe pain on eating, so much so that she was starving to death. She had lost 40 pounds, was weak and looked cachectic. Two physicians had made tentative diag-

nosis of cancer of the stomach. The stomach tube encountered impassable obstruction at the cardia. The x-ray report showed marked cardiac obstruction without dilatation. No organic deformity was noted, but there was a peculiar lack of elasticity to the muscle which suggested organic disease. It was determined to try a mild tentative treatment with air dilatation.

She was dilated with air pressure with temporary and partial relief. There was no blood on the rubber bag, so that it was assumed that she probably did not have a cancer and that it was safe to proceed with the regular water treatment. She stood a pressure of 16 pounds well and has been completely relieved of the spasm. A subsequent acute attack of cholecystitis leads to the belief that she had some chronic irritation of the gall-bladder as the primary cause of the spasm. This patient, I believe, would have gone on to a speedy death had we feared to use the dilator.

Some other cases in this series were really *in extremis* when treated.

Mrs. E. G. had retained hardly any food for a month. She had a large dilatation of the esophagus and bits of orange eaten three days before were washed from the esophagus, showing the high degree of obstruction. One dilatation to 20 pounds relieved her and she was able at once to eat a full dinner, since which time she has had no recurrence, to the best of my knowledge.

Mrs. A. had been getting progressively worse for several years. She had been to many physicians and had a long rest in the sanitarium. There was a high grade obstruction with dilatation above, and death from starvation was imminent. She had lost over 50 pounds. Six dilatations were necessary in this patient, but she is now in perfect health.

The immediate results are spectacular, more so than anything else of which I have knowledge in either medicine or surgery. One who has not been able to eat or drink in comfort for months can eat and drink anything five minutes after the operation. We make it a rule to give the patient a glass of water to drink in large gulps right after dilating so that he can see the difference. The facial expression of the patient is at times most interesting.

After we had finished dilating Dr. W., who had not eaten in comfort for three years, I gave him the water and told him to drink it. He started from habit to sip it. When I told him to gulp it down there was on his very expressive face a look of incredulity and disbelief; then, as the water promptly entered the stomach, his face registerd amazement closely followed by a great look of joy.

Some use a rubber bag which is introduced deflated into the stomach, after which it is inflated and pulled back through the cardia, stretching it as it passes through. To my mind this is not nearly so effectual, and at the same time is probably just as dangerous; the traction can cause shock and it is conceivable that by vagal irritation it might cause death from paralysis of the heart.

I made an air pressure apparatus exactly like the Plummer instrument, except that instead of the water I pumped in air with a blood pressure pump and for a gauge used the Tycos blood pressure dial. The technic used was the same as in the water pressure instrument, inflating the bag while *in situ* in the spasm, not by inflating it in the stomach and pulling it through the cardia. It was found that pressure of 260 mm. distended the bag to the same degree as 10 pounds of water, but that the tension was much more yielding. I tried this instrument on 4 patients, but did not get the marked relief that followed the use of the other instrument. All except one patient had to be dilated later with the Plummer apparatus. We have, therefore, ceased to use the air method.

Surgical Treatment.—In closing I will only mention surgical treatment, which consists in performing gastrostomy and is indicated only in nearly moribund patients as a temporary procedure to allow them to get food into the system and relieve starvation.

The Rochambeau.

DISCUSSION

Dr. R. W. Mills, St. Louis, Mo.—Dr. Verbrycke is to be congratulated on the opportunity of examining and studying such a large series of cases. I might recall that a few years ago we considered a series of ten cases and later an additional fourteen cases which the late Jesse Meyer reported as unusual. Later, Plummer, of Rochester, reported forty cases. The 100 cases reported by Dr. Verbrycke would indicate that the condition is still more common than we had supposed; also that it is becoming more generally recognized, a reflection of the trend in medicine to more accurate and earlier diagnosis. The thing that really causes most concern is the treatment of the condition. It is all right for a man who has dilated many cases to speak lightly of using a dilator, but for the man who has to dilate his first case the situation is not entirely fraught with comfort.

In our own experience with dilatation of cardiospasm several points have come up that may possibly be worth my mentioning. I am not personally in favor of the water distended dilator, but prefer air inflation. We have had an unfortunate experience with the usual water distended apparatus through the bursting of the inside container with resulting difficulty in removing the apparatus. The air distended dilator is not subject to this danger, especially if a tiny air escape is arranged between the inner and outer balloons which can be done at the

upper attachment of the balloons to the applicator. An advantage of the air distended apparatus is that it lends itself to x-ray visualization as a means of control, an aid that we have come to value highly. The dilatation of cardiospasm under fluoroscopic control is a revelation. In the first place the x-ray shows that it is difficult to cause the dilator to straddle the site of spasm, the tendency being for it to slip either upwards and more frequently downward at the moment of distention. It has been found by fluoroscopic observation that the best way to emplace the dilator in the strictured area and to retain it there is to introduce it beyond such point, then slightly inflate and gently pull it into the area of spasm and while holding it there by traction on the oral end of the applicator inflate still further.

The x-ray also strikingly shows that the usual dilator is of greater diameter than is necessary, the area of spasm never being divulsed to anything like the full circumference of the dilator at the time pain is elicited. It seems probable that when fully distended as shown by a pressure indicator the dilator is either above or below the site of spasm. The method of one forcible divulsion has never appealed to me. I prefer a gradual training of the patient first with the stomach tube if conditions permit and later gradual dilatation on different occasions. The same favorable result can be obtained by this method and I believe with greater safety.

Dr. Douglas VanderHoof, Richmond, Va.—The report of 100 cases of cardiospasm is very striking, even in these days when such an extensive study is made of gastrointestinal conditions. If Dr. Verbrycke is correct, and I really believe he is, the rest of us must be overlooking this condition. He emphasized in his paper that in certain cases, 18 I believe, the x-ray was negative, and in 29 the x-ray was not used, a total of 47 cases. He has shown, however, in connection with this point that the x-ray may be negative on one occasion, and yet definite cardiospasm may subsequently be demonstrated; but even at that, a series of 50 cases of cardiospasm would be a very large one. Certainly, in our clinic in Richmond we are not seeing cardiospasm in anything like that number, which may mean, of course, that we are overlooking it.

There are just one or two points I might attempt to cover in connection with the diagnosis of cardiospasm, and one of these is the differentiation between cardiospasm and cancer of the esophagus. In past years an attempt was made to use the esophagoscope in this differentiation. I think, however, that is a difficult procedure, and is unreliable, as has been demonstrated in certain cases I have seen in which the diagnosis of malignant disease was made from such an examination, whereas the clinical history and the subsequent course showed that the condition was one of spasm. Then again, we must remember this, and it is very important: the x-ray picture in typical cardiospasm shows a conical shadow, ending in a point something like that of a large lead pencil, and the contour should be smooth. In certain cases, especially where the esophagus is dilated, one may get an irregular contour due to the presence of food remnants. Before jumping to the conclusion that a filling defect exists, as may be produced by carcinoma, it is advisable to use a stomach tube and wash out the esophagus and x-ray the patient once more. In that way a serious error may be avoided.

One other point occurs to me which Dr. Verbrycke would have possibly covered if he had had more time, and that is the value of medical treatment in certain cases of cardiospasm, including the so-called third group, those with dilatation of the esophagus above the spasm. The procedure of dilating the spasm has always impressed me as being a formidable one, and an attempt has been made in certain cases to employ medical treatment. In a recent case this proved strikingly successful. An x-ray examination in this particular instance showed a marked spasm, a definite dilatation of the esophagus above the spasm and the patient at the time we saw him was unable to swallow water. In fact, he was referred to me by a neurologist, to whom he had been sent because it was feared he had a bulbar paralysis. In this particular case the man was much opposed to any mechanical treatment. We limited the diet to bland articles, without condiments, and so forth. We asked him to precede his intake of food with a tablespoonful of olive oil, gave him honey in his diet, and proceeded to give him massive doses of belladonna in the form of the tincture up to the point of physiologic effect and gave him also full doses of benzyl benzoate. The immediate result was striking. This particular patient has been under observation for a period now of about three and a half or four months, with absolutely no return of the symptoms. The symptoms prior to treatment had been in existence for about eighteen months, although the patient never sought treatment until complete obstruction appeared.

Dr. George M. Niles, Atlanta, Ga.—I have had occasion to deal with a number of these cases of cardiospasm and they have given me more or less trouble and anxiety. Dr. Verbrycke admits that a large proportion of them have either a neurotic or psychic etiology. We nearly always find them in the years between 20 and 40. I have never seen a case of cardiospasm in an aged individual.

Another etiologic cause which I feel sure should be mentioned refers to the reflex influence of small erosions near the cardia which are almost impossible to recognize. It has been admitted by several investigators that these small erosions near the cardia are more frequent than we have heretofore realized. The reflex causes, of course, we have to admit, such as focal infections, intestinal toxemia, pathologic appendices, and possibly malignant troubles at some distance from there. We have to consider them, but I am satisfied two of the greatest causes of disturbed psychic poise are rapid eating and various phobias. Sometimes a man gets the habit started by rapid eating, and after the habit is once set in motion he finds under certain conditions he chokes up; he gets frightened, and the very act of fear superinduces it.

I remember one case that I had much trouble with. The patient was a newspaper reporter, an active, energetic, highstrung man, who told me that whenever everything went along smoothly with him and his assignments were not troublesome, he swallowed with the greatest ease; but when he got some unpleasant assignments which gave him much trouble and worry, he had to be very careful or he choked up. This he had noticed for several years, and formed his own conclusion that his only safety was to keep as quiet as possible and have a good mental poise. This is one of the injunctions we have to give patients, namely, to watch out for excitement and watch out for worry and use deliberation in eating.

Just before eating I advise them to take some oily preparation into the esophagus, letting it trickle down slowly, either olive oil or some form of mineral oil, and in a number of instances that is helpful. Above all, these patients should strive to keep themselves in a quiet, placid, serene frame of mind. "A merry heart doeth good like medicine."

Dr. J. C. Bradley, Washington, D. C.—I wonder how many general practitioners really think of cardiospasm when they see a condition of the stomach with symptoms as outlined by Dr. Verbrycke, such as pain and sticking food, regurgitation, probably constipation, and so on. We have a tendency to think of something more serious or more definite in the stomach, such as pylorospasm, ulcer, or probably malignancy.

I remember a case I sent to Dr. Verbrycke. I did not think of cardiospasm. The case was suffering apparently from autointoxication, which was proven on bacteriological examination later, and in this case autointoxication was undoubtedly the cause of the cardiospasm. I think that nervous and irritative reflex conditions are often a cause, but in a great many cases the cardiospasm is caused by toxic conditions, such as autointoxication. He found a large number of cases suffering from autointoxication.

I am sorry Dr. Verbrycke did not have an opportunity to demonstrate his instrument, and I hope he will be able to do that. He has an instrument gauge here that will work wonders, and I beg to differ with Dr. Mills regarding the rupture of one of these bags causing trouble. It does not cause bad effects and Dr. Verbrycke seems to get better results with water dilatation than with air. I have seen marked improvement by one treatment. Usually, you have to dilate once. He has a gauge by the water tap, and if the patient suffers any inconvenience, he can be immediately relieved by turning off the water. This is the best instrument by far that is used for dilatation.

Dr. A. L. Gray, Richmond, Va.—I want to discuss Dr. Verbrycke's paper from the standpoint of the x-ray diagnosis. I believe if a suitable standard meal is given and an actual cardiospasm looked for, we shall find a great many more cases than Dr. Verbrycke reports without such a meal. It is possible that the meal given is usually too liquid and flows through. I have seen, in cases of organic stricture, a meal of milk and bismuth or barium flow through without any apparent obstruction at all. In my personal technic, I use a very thick Bulgarian buttermilk and watch it from the time it is swallowed until it enters the stomach, noting the time required for the esophagus to empty itself. If the esophagus is empty within two minutes, I am satisfied there is no cardiospasm, even of the first degree.

I have found myself dividing cardiospasm into two classes rather than into three: one, cardiospasm without dilatation; and the other, cardiospasm with dilatation. I note the emptying time of the esophagus and report this, if there is any retardation at all.

As to differentiating between carcinoma of the cardiac orifice and cardiospasm, Dr. VanderHoof has brought out a most valuable point, and that is if we fail to get a smooth, pointed shadow, do not assume that it is necessarily carcinoma or an organic irregular stricture of some kind, but proceed as he has told you. Wash out the esophagus and try it again, and in an occasional case, not very many, I am sure you will find that we get a link-sausage appearance of the lower end of the esophagus.

Most of us are too much in the habit of looking for trouble with the stomach and forgetting about the esophagus. We go ahead and give barium and water, which runs through, and after it has reached the stomach, or maybe the patient has had a six-hour previous meal, we hurry to examine the stomach without noting the esophagus. Then we may give a second meal according to the method used in many of the large clinics and observe the stomach itself, but very little attention is paid the esophagus. If we give a meal that is thick enough and watch it enter the esophagus until it all goes into the stomach, we can discover many of these first stage cases that Dr. Verbrycke has mentioned.

Dr. Julius Friedenwald, Baltimore, Md.—It is important to remember that there are really two distinct types of cardiospasm. Dr. Verbrycke has very properly called attention to the first type, that is the acute forms due to neurasthenia or hysteria, and which can usually be effectively handled by means of the usual methods of treating nervous affections. Many of these cases yield to psychotherapy, rest cures, bromides, etc. The second variety, the chronic forms, are usually associated with an idiopathic dilatation of the esophagus. These constitute a much smaller group of cases and must be treated by means of forcible dilatation with bougies or special instruments to accomplish this purpose. The instrument I have utilized with much satisfaction is the dilator devised by the late Jesse Meyer.

I wish to call your attention to the fact that even after treatment of these cases, and when the patient is apparently cured, relapses are not uncommon, and the patient may have to undergo other courses of dilatation perhaps after a period of months or even years. Jesse Meyer called attention especially to this fact.

Dr. Verbrycke (closing).—Had I had time to

complete my paper, I think the paper itself would have answered many of the points brought up in the discussion, and I will touch on a few of them. I agree in *toto* with what Dr. Gray and Dr. Friedenwald said. I do not quite agree with Dr. Mills in some of the points brought out by him. In the first place, the danger of rupture of this bag—this bag communicates with the inside of the tube. If any one of these coverings should break, no harm can result. In the second place, the position of the bag. It is put down on a silk thread, which has been swallowed the night before, until it gets in the cardia. A fisherman with experience can tell when he has a certain kind of fish by the feel, and so one can tell when this bag is in the cardia. Dilate a little and draw it up until it firmly engages. If you do not get a steady pull by the part bulging out below the cardia, the cardia is firmly contracting. If you do not get that pull you are not in the right place and you manipulate up or down until you get into the right place. Dr. Mills suggested to me last night repeated shorter dilatations should be made. My patients dread it more and more each time. It is not a pleasant procedure. Fifty per cent. of the cases are cured by one attempt. I have the statistics of a number of cases in which I have used it.

Then we have quite a wide range of position of this bag. If you hit within an inch in any direction, you are still in the cardia, depending on the pull. You can tell by the feel of it.

I do not believe we get the same results with air dilatation that we can with water dilatation. We can distend the bag to the same degree, but the hardness of the bag varies, and since air is more compressible than water you can not stretch with air as much as you can with water. Every case I have stretched with air has later had to be stretched and cured with water treatment.

With reference to the remarks of Dr. VanderHoof, I am firmly convinced that medicine has a place in the first and in some of the second-stage cases. In the third-stage cases you are only temporizing by medical treatment. One of these patients died because he was put off; his condition of mild cardiospasm had lasted for thirty years. He got to such a degree that a thread would not go through his cardia. He had a long tortuous esophagus, so that it was impossible to pass anything down. He died in spite of a gastrostomy, which was done to give him food.

In regard to what Dr. Niles has said, I feel one can often start something going and can not stop it. That is what etiological factors do when they start cardiospasm going. When you remove the etiological factor the thing has been started and does not stop.

Dr. Friedenwald is correct when he says that cases with dilatation and cases without dilatation have to be handled differently, and there is no cure with dilatation, as a rule, excepting by the mechanical methods.

COCCIDIOIDAL GRANULOMA, INCLUDING THE FIRST REPORTED CASE EAST OF THE MISSISSIPPI*

By Kenneth M. Lynch, M.D.,
Professor of Pathology, Medical College of the State of South Carolina, Charleston, S. C.

Of interest from several viewpoints is the case of N. D., a colored woman, who was admitted to the tuberculosis ward of the Roper Hospital, Charleston, S. C., on December 10, 1918.

The hospital record furnishes unsatisfactory information of the case for two reasons. First, she was delirious when admitted and remained so until she died; second, the diagnosis of pulmonary tuberculosis appeared so plainly to be correct that, probably on account of the condition of the patient, a thorough investigation of the case was not made.

Her age was given as 45 years and her occupation as household service. At the time of admission her pulse rate was 136 and the pulse was very weak. Her respiration rate was 44. Her temperature normal. Physical examination showed marked emaciation; teeth covered with sordes; rales and areas of consolidation were in the apex of the right lung and a lesion described as a bedsore was on the right buttock. On the second day at 4 p. m. her temperature was 99°; pulse 146; and respiration 64. That night her pulse was 128; temperature 97°; respirations 52. The next morning her temperature was 100.8°; respirations 48; and her pulse was so weak it could not be counted. Death occurred on this day, December 12, and she came to necropsy with the diagnosis of pulmonary tuberculosis. No sputum nor other examinations appear to have been made.

At the necropsy there was some doubt of the correctness of the diagnosis, mainly on account of the character of the pulmonary lesions, but the real nature of the condition was not suspected until the microscopic slides came to me for observation. The gross necropsy findings are recorded as several empty cavities in the apex of the right lung, with complete but delicate encapsulation, and no surrounding tubercle formation, some toughness and emphysema of the lung generally, edema of the lungs, parenchymatous degeneration of the heart, and acute nephritis.

The microscopic slides were brought to me for consultation and on hurried examination I was about to pass the case as one of tuberculosis when I happened to notice a peculiar body within a giant cell. Then, upon thorough detailed examination, I found the widespread invasion of the parasite coccidioides immitis with the lesions produced by it, and came to a diagnosis of coccidioidal granuloma.

After discovering the true nature of the case

*Read in Section on Medicine, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

an attempt was made to find out something of the previous history of the woman. It was learned that she was born and had lived on one of the sea islands near Charleston, had come to work in Charleston as a household servant several months past, and had never been out of this region. She was taken sick about October 1, 1918, with what was thought to be influenza. The attack was rather severe. She was in bed three weeks, and on getting up was unable to resume her work. After being up for two weeks she returned to bed, where she remained until death, during which time she was treated for kidney trouble by a negro physician. It was learned also that she had a sister living with her who was sick in the same way at the same time, but went back to the islands, and nothing further was known of her.

It has been said that the anatomic changes in coccidioidal granuloma resemble those of tuberculosis so closely as to make the diseases indistinguishable save by finding the organism.

Now, while this case would probably have passed as tuberculosis had the organism not been seen, after the nature of the lesion was recognized the anatomic changes furnish certain features which are different at least from the typical case of tuberculosis; and even without finding the organism it should be put down as of doubtful nature. In the first place, the small cavities in the lung did not show a typical tuberculous reaction surrounding them and there was no caseation evident either grossly or microscopically. There was a thin granulation tissue wall which was highly vascular; there were no tubercles; the young connective tissue cells, endothelial cells, leucocytes, lymphocytes and giant cells were not organized about particular foci; the giant cells, which were numerous, were most plentiful near the cavity, were irregular, not hyaline, and contained clumps of nuclei of varying numbers about the center of the cell. The parasite was present within the giant cells as the single round cell with capsule and round central body about 15 microns in diameter; as larger encapsulated bodies within or outside the giant cells, containing varying numbers of minute crescentic, angular, or rounded, daughter bodies; or as larger irregular spaces without definite capsule surrounded by granular detritus—apparently from the destruction of the cell which contained the body—containing varying numbers of the same minute daughter bodies. The destruction of tissue appeared to be individual cellular destruction, disintegration and dissolution, rather than larger areas of multicellular death which would have shown the presence of necrotic material. The cavity was more or less clean of necrotic substance. The vascularity, the lack of focal organization as tubercles, the character of the giant cells, and the lack of multicellular necrosis, particularly of caseation, seemed to furnish differentiation from tuberculosis in this particular lesion of this case.

In other organs the miliary character of the lesions gave rise to a closer resemblance to tuberculosis, but even here the lack of multicellular necrosis and the appearance of the giant cells furnished differentiating features. Miliary lesions were widespread in the liver, spleen, and pancreas. In the pancreas the invasion occurred in the acini and also in the islands of Langerhans. The lesions were small and bore little resemblance to tuberculosis. There were individual gland cell destruction, the accumulation of young connective tissue cells and lymphocytes, but no giant cells. The parasites were mainly the large segmenting forms. In the spleen both sinus walls and malpighian bodies were the seat of young lesions. Here single cell invasion and destruction, with the accumulation of segmented parasites in cell remains with no reaction as yet occurring, was seen. Here also were small collections of young connective tissue cells and lymphocytes, with an occasional small giant cell. The foci in the liver were practically limited to the interlobular framework, where were young lesions very similar to those in the spleen, but with more giant cells and resembling miliary tubercles more.

The kidneys exhibited the most extensive involvement, of a linear distribution as a rule, resembling the extension of abscesses of these organs. The glomeruli and intertubular tissues were mainly affected, but the granulomatous tissue had grown and ruptured into the tubules until even the lumen was extensively invaded The lumen of many tubules contained pus and some parasites and these were undoubtedly passing out in the urine. There was little of the tubercle-like formation and few giant cells were seen. It was more of a granulation tissue growth, with extensive polynuclear infiltration taking place in parts of glomeruli. It obliterated whole glomeruli, occurred between tubules, bursting into tubules, and in large areas the tubular structure was practically obscured. The parasites were in various stages, prominent in large connective tissue or endothelia-like cells, or extracellular. There was no multicellular necrosis and no caseation, but evidence of single cell destruction and disintegration with liberation of parasites.

I saw no positive evidence of invasion of epithelium or the essential cells of any of these organs, and the pathology of the process appeared to me to be a matter of blood vascular dissemination of the parasite, the phagocytization of the organism by an endothelial cell, possibly of the capillaries, probably also by wandering endothelial leucocytes, the destruction of the phagocyte and liberation of the segmented organism, further phagocytization with progressive cellular destruction, the accumulation of endothelial leucocytes and some lymphocytes, and the formation of foreign body giant cell phagocytes, with thus a gradual growth of the lesion. The absence of polynuclears except in the larger lesions in the kidneys, and here their lack of proximity to the parasite, seemed to signify that polynuclear leucocytosis was not a part of the early reaction and might have been the result of secondary infection.

As to the atrium of infection, the oldest lesion was apparently in the lung, the others seeming to be from hematogenous dissemination. Whether the infection followed influenza or whether the

sickness was from coccioides infection in the beginning, the history is also suggestive of primary pulmonary invasion. There were no superficial lesions except the bed sore on the buttock and no sections were taken from it.

The case calls to our attention a disease heretofore unrecognized in this part of the country.

The disease coccidioidal granuloma was first reported in 1891 in a native of the Argentine Republic by Wernicke.[1] The parasite in this case was thought to be a sporozoon. In 1894, Rixford[2] reported a case from California. The parasite in this case was studied by Rixford and Gilchrist[3] and named coccidioides immitis. Later in 1894, the third case, also from California, was reported by Thorne[4] and Rixford[3]. The fourth case was reported, in 1900, by Ophuls and Moffitt,[5] who first recognized that the organism belongs to the molds instead of being a protozoon.

Up to the present there have been forty-four cases reported, this making the forty-fifth. Forty-one were in residents or former residents of California. One originated in Colorado, one in Missouri, the first in the Argentine, and this, the forty-fifth, in South Carolina. The San Joaquin Valley of California has been the source of the majority of reported cases.

A large per cent. of these cases has been in adult males, in fact only one woman and one child are reported in the first twenty-eight cases. This case is, I believe, the second reported in a woman. The disease is not confined to any particular nationality, class or race; Caucasians, Mongolians, American Indians and negroes are represented; a native of the Argentine, a Portuguese, German, American Indian. Mexican, Japanese, Chinese, Greek, and native white and black Americans. All classes of society are included, but the majority have been laborers engaged in irrigation work in lower California.

Considering the widespread development of the disease, it is not improbable that it is present where it has not been recognized and is more prevalent where single cases have been found, and that it passes for tuberculosis.

Those common cases of supposed tuberculosis in which the tubercle bacillus is not demonstrable should be closely investigated for this or similar organisms.

ONSET AND COURSE

In some cases the onset has been sudden, very much like the acute febrile diseases, while in others there has been a gradual onset, the patient hardly knowing when the illness began. Many cases have shown remissions, usually for periods of only a few weeks, but occasionally as long as two years. Evidences of systemic infection by the appearance of multiple abscesses have commonly occurred in the course of several weeks. Some cases have gone on to a fatal termination without the appearance of cutaneous abscess formation, and in these cases the lungs have appeared to bear the brunt of the infection; the patient has shown thoracic pain, cough, rapid emaciation, weakness, night sweats, chills and irregular fever which ranged from 99 to 104, but in some remained below 101, and late profuse expectoration, at times blood-tinged. Cases with initial skin lesions have usually progressed more slowly and have developed painless subcutaneous abscesses, very much like glandular tuberculosis. These abscesses have destroyed tissue extensively and bones have been frequently involved, notably the occipital bone, sternum, vertebrae, ribs, femur and humerus.

The abscesses have burrowed deep, but usually have pointed, and discharged quantities of thick pus, frequently containing apparently pure cultures of coccidioides immitis. All of these apparently cutaneous cases which have come to necropsy have shown systemic involvement.

Before death the lungs have usually presented the physical signs of tuberculosis.

The patients have not responded to treatment, but have become progressively weaker, always with some fever, some showing a weak rapid pulse, some having several convulsions, some being delirious for several days before death.

LABORATORY FINDINGS

Blood cultures have been negative save in one case. The sputum has been profuse, mucoid in some cases, purulent in others, and the coccidioides immitis has been found in large numbers.

The urine may show albumin and casts. It probably contained the parasite in this case.

The leucocyte count has been from 9,000 to 20,000 with a normal differential count

save for the presence of 3 or 4 per cent. eosinophiles.

The lesion of the infection has been found in practically every organ and tissue of the body.

TREATMENT AND PROGNOSIS

No successful treatment has been devised and all cases save one have died within from a few weeks to nine years. The only case recovering was one in which the infection was recognized in an extremity and the infected member amputated apparently before dissemination had occurred.

SUMMARY

The first case of coccidioides immitis infection in South Carolina and east of the Mississippi is here reported. It is the forty-fifth case known, the second case in a woman, and the fourth that was not in California.

The confusion of the disease with tuberculosis has again occurred, even though a complete investigation of the case would no doubt have revealed its true nature. The parasite should have been found in the sputum and urine. Again we are reminded that even in medicine things are not always what they seem and no diagnosis on circumstantial evidence can be positive. The failure to use methods and means which are at hand for diagnosis, no matter how apparently clear the case may be is inexcusable.

It is highly probable that infection by coccidioides immitis is with us where we have not recognized it, and it is desirable that those cases of supposed tuberculosis in which the tubercle bacillus is not demonstrable should be carefully investigated for this or kindred infection.

BIBLIOGRAPHY

1. Wernicke, Robert: Ueber einen Protozoenbefund bei Mycosis fungoides; Centralbl. f. Bakt., 1892, XII, 859.

2. Rixford, Emmet: Case Report, Occidental Medical Times, 1894, VIII, 326.

3. Rixford, Emmet, and Gilchrist, T. C.: Two Cases of Protozoon (coccidioidal) Infection of the Skin and Other Organs; Johns Hopkins Hospital Rep., 1896, I, 209.

4. Thorne, W. S.: A Case of Protozoic Skin Disease; Occidental Medical Times, 1894, VIII, 703.

5. Ophuls, W., and Moffitt, H. C.: A New Pathogenic Mold; (Formerly described as a protozoon; Coccidioides immitis pyogenus;) Preliminary Report, Phila. Med. Jour., 1900, v. 1471.

DISCUSSION

Dr. J. Heyward Gibbes, Columbia, S. C.—The doctor's report of this case is significant in several respects. In the first place, he calls attention to the fact that this disease exists as an indigenous condition on the South Atlantic seaboard. The probabilities are that we have overlooked this condition. In the second place, his report of his case calls attention to the fact that this relatively rare disease may exist as a widespread systemic infection without the auxiliary skin lesions, and that unless careful searches and investigations be made, we may encounter such a condition and mistake it for a common pulmonary disease, tuberculosis or other types of acute infectious diseases.

It is decidedly unfortunate that Dr. Lynch's report does not incorporate a more complete clinical picture and study of this particular patient. I am in hopes in his closing remarks he will take occasion to point out to us the staining characteristics of the organisms concerned. The organisms of this disease can readily be obtained from the pustular lesions of the skin and the urine, but I do think Dr. Lynch should emphasize the means of identifying the organism in these secretions and excreta.

Dr. Lynch (closing.)—In response to Dr. Gibbes' question the parasite or organism is found in the pus from the cutaneous lesion or in pulmonary involvement it may be found in the sputum. It is fairly easy of recognition. It varies in size considerably from 5 to 50 microns. It is a mold. It can be found easily by the addition of potassium hydroxid to the fresh pus. It is a double contoured or encapsulated round cell. It does not show budding, except in old cultures. Its internal segmentation differentiates it from the organisms of blastomycosis. It will stain easily, but it is unnecessary to stain it. The recognition of a mold with internal segmentation, without the formation of external spores, is very suggestive of the presence of the parasite.

A Member—Does it grow in chains?

Dr. Lynch—Not in the body. I do not recall at present the character of the medium which is best suitable for it to grow on. In this case we did not get the parasite before death and did no cultivation. It has been cultivated and transmitted experimentally to a number of the lower animals with the production of the same lesions. I believe Ophuls was the original cultivator.

TROPICAL DISEASES AND PUBLIC HEALTH

STUDIES ON MALARIA CONTROL. XI. CONTROL OF MALARIA BY QUININE STERILIZATION OF THE HUMAN HOST*

By C. C. Bass, M.D.,
New Orleans, La.

This paper is intended to give a brief historical review of the developments and progress of malaria control work in Bolivar and Sunflower Counties, Mississippi, with which it has been the author's privilege to be associated. The work was undertaken as an experiment, with the object of determining the possibility and practicability of malaria control by disinfecting the human host of the parasite, without regard to the presence or abundance of anophelines.

After a certain amount of preliminary investigations, especially as to methods of treatment, and preliminary training of a suitable staff, work was begun in Bolivar County about February 1, 1916. The original plan was to take up the territory by communities of suitable size, make intensive malaria surveys and furnish free quinine treatment to all who gave histories of having had recent attacks of malaria and all who were found to have malaria parasites in their blood. Considerable educational work was also contemplated, with the intention of informing as large a proportion of the population as possible what the specific cause of malaria is, how it is carried, and especially the importance of thorough quinine treatment to get rid of the parasites.

As work progressed, questions arose from time to time that had not arisen when the original plans were laid out. Some of these questions were of vital importance and it became very apparent that information that might shed light upon them was essential for the highest degree of malaria control by this method. Perhaps the most important feature that required improvement was the method of treatment to disinfect infected persons. Not only must the treatment be effective, but it must be practical and convenient. Otherwise it would not be taken by people, many of whom can only with difficulty be led to believe they need it.

After getting such information as we could from the literature and making preliminary observations on cases of malaria in the Charity Hospital, in New Orleans, a certain definite method of treatment was adopted. This was 10 grains quinine sulphate every night before retiring for a period of four weeks for adults and ½ grain for each year of age for children under 20 years of age. After work had been under way for several months and sufficient time had elapsed for resurveys to be made to indicate the results of the treatment, it appeared that the treatment employed was not disinfecting as large a per cent. as was desirable. There were too many relapses. In fact, we are inclined to think at the present time that the treatment did not disinfect more than 60 per cent. or perhaps 70 per cent. of those who took it faithfully. It was very apparent that considerable improvement must be made in the method of treatment. During the latter part of 1916 and most of 1917, different methods of treatment were tried out in different communities with the hope of being able to select the best for practical purposes. Towards the close of 1917 it was felt that though there was yet much to learn and perhaps room for considerable improvement, we were able to lay down a method of treatment which is practical and at the same

---

*Read before Conference on Malaria (National Malaria Committee), Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

From the Department of Experimental Medicine, Tulane Medical College, New Orleans, La.

This is one of a series of papers being published, based largely or entirely upon malaria control work conducted jointly by the International Health Board and the Mississippi State Board of Health. The author, however is alone responsible for the views expressed. The other ten papers of this series appeared as follows:

1. Southern Medical Journal, Vol. 12, No. 8, p. 456.
2. Journal A.M.A., Vol. 72, No. 17, p. 1218.
3. Southern Medical Journal, Vol. 12, No. 4, p. 190.
4. Osler Memorial Volume, Paul B. Hoeber, New York, publisher.
5. Southern Medical Journal, Vol. 12, No. 6, p. 306.
6. Southern Medical Journal, Vol. 12, No. 8, p. 460.
7. Southern Medical Journal, Vol. 12, No. 8, p. 462.
8. Southern Medical Journal, Vol. 12, No. 8, p. 465.
9. Journal A.M.A., Vol. 73, No. 1, p. 21.
10. Will appear in the Journal of the American Public Health Association shortly.

time disinfects a very high per cent. of those who take it. The essential change made from the original method of treatment was to continue it for eight weeks instead of four.

During 1918 a complete analysis of the data obtained in 1916 and 1917 was made, and it was found from the analysis of the surveys of many thousands of persons who were treated that the results were not as good in the case of children as in adults. This would seem to indicate that the doses for children should be somewhat higher than those employed, which were ½ grain for each year of age under twenty. With the data in hand, calculations were made to determine what proportionate doses for children of different ages would be required to give as good results as 10 grains for adults gives. After making certain adjustments to reduce the number of different size doses that would be required for all ages and to make it most practical, the following doses for different ages were adopted: under one year, ½ grain; one year, 1 grain; two years, 2 grains; three and four years, 3 grains; five, six and seven years, 4 grains; eight, nine and ten years, 6 grains; eleven, twelve, thirteen and fourteen years, 8 grains; fifteen years and over, 10 grains. These doses continued for a period of eight weeks, have been adopted as our standard method of treatment, and unless other very conclusive evidence should indicate to the contrary, it is believed that it should be employed for this purpose.

For children under eight years of age the quinine is dispensed suspended in aromatic syrup of yerba santa so prepared that one teaspoonful contains the desired dose. In the earlier work the larger doses were dispensed in capsules, each capsule containing one-half of the desired dose. During 1918 experiments were conducted which convinced the author that ordinary compressed tablets (made with starch and not Acacia) are equal to if not better than the capsules from the standpoint of solubility, convenience of taking, etc. They are less bulky and somewhat less expensive. Treatment consisting of one dose (two tablets or one teaspoonful) as indicated above, every night for a period of eight weeks has been adopted with us as the standard for malaria control by disinfection of infected persons. The author believes that unless and until a better and more practical method is found, it should be employed generally.

Though prophylactic treatment of all persons in the community was not contemplated in our original plans, it was tried in two communities of nine square miles each in 1917. In one community quinine prophylactic treatment of all people in the community was kept up for a period of five months and in another for three months. A special effort was made to get everybody to take their quinine regularly. Most of them did; some did not. The prophylactic treatment employed consisted of one-half of the dose employed for treatment for the purpose of disinfection. The treatment was found to be insufficient for the purpose, because in a number of instances people actually developed clinical malaria while taking the quinine. It is quite possible that many of these, at least, were persons who were already infected and that they do not necessarily show failure of the treatment for prophylactic purposes alone. However, the number who did develop symptoms was so large that the treatment became rather unpopular, with some of the people at least. An individual is quite disappointed to have malaria develop while he is taking the very treatment which he is advised to take to keep it off. The dose must be large enough to prevent this in a large part of the cases, at least. This test of prophylactic quinine was not pushed to conclusion, but the indications are that the dose for prophylaxis should be the same as the dose for disinfection; that is, 10 grains.

During the experimental work in 1916 and 1917, a total of 328 square miles, containing a population of approximately thirty-five thousand, was surveyed and put under treatment in one way or another. In many of the communities or sub-divisions of the area, the method of treatment tried was not such as would, in the light of our present information, be expected to contribute very largely to the reduction of malaria. Resurveys of these areas, however, have served to furnish valuable information as to the relative value of different methods of treatment

and different methods of carrying out the field work. The highest degree of control obtained was a little more than 80 per cent. of reduction as shown by subsequent survey in one community of 9 square miles. In other sections or communities, the method followed produced much less favorable results. There are complete records of a total of 31,459 persons on whom first blood examinations were made in the entire area. Re-examination of the blood was made of a total of 17,791 from a few months to a year from the date of the first survey and treatment. These re-examinations indicate an average reduction of malaria in the entire group of 35.52 per cent. Since this is made up of the results in a large number of experimental groups, it should not be considered the maximum that could be expected under conditions that were not experimental and when the best methods are followed.

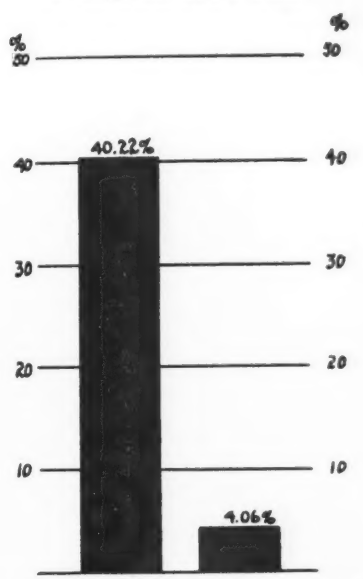
Toward the close of 1917 it was thought that sufficient information was in hand to make it possible to lay out a plan for malaria control by this method which would promise fairly definite results. The standard plan referred to above was adopted and in order to try it out and make a demonstration under conditions supposed to be representative of the conditions in the malaria section of the Mississippi Delta, it was decided to undertake malaria control in a suitable area in the adjoining county of Sunflower. This was undertaken and during 1918 intensive malaria control work according to the best method former experience had indicated was carried out. During the year an area of 100 square miles containing a rural population of about 8,000 and about 1,000 in the town of Ruleville was covered. The area was taken up by communities of suitable size and those indicated by the surveys were furnished the standard eight weeks' treatment free. These treatments were followed up during the eight weeks period from one to three times to encourage the people to carry it out. After the intensive work in each community arrangements were made to have free quinine kept at convenient quinine stations to take care of relapses or new cases of malaria that might occur in people already living in the community or in people who might come into the community later. Whether this provision is sufficient to prevent the return of the former prevalence of malaria remains to be determined.

A report of all cases of malaria treated by the physicians practicing in the one hundred square mile area covered during 1918 was obtained and it is interesting to note that only 181 persons among over eight thousand listed in this area in the surveys had attacks of malaria treated by physicians during the year after the first survey and treatment. This is especially striking when it is recalled that over 40 % had attacks during the twelve months previous to survey and treatment.

During 1919 a resurvey of about half of the area worked in 1918 has been made, in which was recorded the histories of attacks of malaria since the first survey and treatment. These resurveys were made approximately twelve months from the date of the first survey and treatment and we have, therefore, for comparison the per cent. who had attacks during the twelve months following the starting of treatment and the per cent. who had attacks during the twelve months previous. Forty and twenty-two hundredths per cent. had attacks during the twelve months previous to treatment and 4.06 % had attacks during the twelve months following the first survey and treatment, indicating a reduction in prevalence of 89. 9%. Repeated visits in the area and conversation with the well informed class of people indicated that there was very little malaria in the area after treatment was furnished. We have, therefore, abundant evidence of a high degree of reduction, the small number of cases treated by physicians, the reduction in histories of attacks in those who were resurveyed during 1919, and the general observation that malaria was very scarce, to say the least. On some plantations where malaria had formerly greatly interfered with the labor, there were no cases of malaria during the year following treatment. In this connection, however, it should be pointed out that there was a natural reduction in the prevalence of malaria during 1918 of considerable importance and any apparent reduction from anti-malaria operations must be discounted considerably. Just to what extent we do not know at the present time.

Since the work in this one hundred square mile area appeared to be highly successful and indicated that it is practical to reduce greatly the prevalence of malaria by the somewhat intensive method of malaria control by quinine sterilization of the human host it was thought desirable to try a somewhat less intensive plan. It was desired to see what could be accomplished by general publicity methods. During the first half of the present year an effort was made to induce all the people in Sunflower County who had had attacks of malaria during the previous twelve months to take the necessary quinine treatment. The main avenues through which the people were to be reached were public talks in schools and other places, newspaper advertisements, moving picture show advertisements, personal letters to physicians, personal and circular letters to citizens and to voters of the County and to other groups, posting placards and distribution of literature ("Some Facts About Malaria"). Quinine was placed in all the stores of the County in the form of the standard treatment previously adopted to be sold at cost. More than one hundred stores throughout the County carrying this standard form of treatment made it easy for anybody who desired to do so to get the proper treatment at reasonable expense. It was hoped that a large proportion, at least, of those who had recently had attacks of malaria and were therefore probably malaria carriers would buy the necessary treatment and take it. After making liberal allowance for all probable reductions, it was estimated that at least seventy-five hundred persons should obtain and take the quinine treatment. Up to July 1, only about seven hundred fifty treatments had been sold, or approximately 10 % of what theoretically should have been sold. Though it would not be justifiable to conclude that the attempt to control malaria in this way was an entire failure, at the same time the trial certainly failed to demonstrate any reasonable probability of controlling by this method in a short time. If the same method was continued over a much longer period of time, it is quite possible that much more favorable results would follow. Though much of the publicity work has been discontinued during the latter half of 1919, a certain amount has been continued and the quinine stores have also been continued. It is the present intention to continue the sale of quinine at cost in Sunflower County for some time in the future with the hope of gaining definite information as to its value.

About July 1, intensive control work according to the same method employed in the one hundred square mile area in 1918 was resumed, and the area covered up to the present time is over one hundred square miles. The only change made has been instead of furnishing free quinine, people have been required to buy their quinine treatment. Though it was doubtful at first whether this would be done to sufficient extent to be practical, experience has demonstrated that there is little or no difficulty. In fact, it not only seems that they will buy their quinine, but it is believed that they take it better because of the fact that they paid for it. If fur-



Reduction in prevalence of malaria in a 100 square mile area in Sunflower County, Mississippi, 89.9%, following intensive malaria control work in 1918. (The tall column represents the proportion of the total population who had attacks of malaria during the twelve months previous to the first survey and treatment, and the short column the proportion who had attacks during the twelve months following.)

ther experience confirms the present impression, this will make for quite a saving in the budget for malaria control by quinine treatment.

In conclusion, it should be stated that plans under consideration at the present time contemplate continued observation and supervision over the first one hundred square mile area in Sunflower County, with a view to holding and perhaps improving the results obtained. Continued observation and supervision will be necessary to demonstrate whether the apparent reduction in this area will be lasting and perhaps improved upon.

It is also contemplated to continue the sale of quinine through the quinine stores as well as a certain amount of publicity work throughout the County. If any considerable reduction results from this sale of proper quinine treatment over the County and from the general publicity work, it should show a reduction in the number of cases of malaria reported by physicians of Sunflower County from year to year. The work done in the County previous to 1919 would not have effected these reports much, because only about one-seventh of the County was reached.

DISCUSSION

Dr. Graham E. Henson, Jacksonville, Fla.—At the Nashville meeting of the Southern Medical Association in 1910, it was my privilege to read a paper before the organization of the character presented by Dr. Bass. Up to that time there had been little, if any, attention paid to the sterilization of the human host. Since then those of us who are enthusiastic about controlling malaria by this means not to the exclusion of any other means have gradually gained in number. There is no doubt, as I said this morning, that there are sections of the country where it is a great deal more feasible to control malaria by mosquito reduction than by sterilization of the human host. It matters not what your geographical surroundings are, with a proper amount of attention it is always practical to sterilize the human host. The whole thing can be summed up in the matter of the attitude of the physician and the public. The matter of the education of the physician is important. It is an especially unfortunate affair that with so few diseases in which we have a specific we can not arrive at a standard treatment of malaria, a standard treatment adopted and approved by the medical profession. If we had that, it would be only a short time before malaria would be completely eradicated.

I would like to ask Dr. Bass what percentage of recurrences have been found among those treated, where the patient was given 30 grains of quinine for four days followed by 10 grains upon retiring, continuing for six weeks? My reason for asking that question is that no method is 100 per cent. efficient. It just happened that the very first case in which I had an opportunity to administer quinine according to Dr. Bass' method of treatment had a recurrence on the fourteenth day.

Dr. Bass—While taking the quinine?

Dr. Henson—Yes. I felt that it must be an unusual case and am anxious to know whether I am right in my deduction. If not, it would almost seem that we should administer 30 grains of quinine for a longer period.

Dr. William Krauss, Memphis, Tenn.—There are now and then obstinate cases of malaria, but I do not think that would have any bearing on the epidemiological question. I believe that this constitutes perhaps the first voluminous accumulation of facts with regard to the sterilization of the host and it is of great value.

Dr. H. R. Carter—It is the first work on a large scale.

Dr. Krauss—This is some really constructive work, when you look at these figures. In 1918, which was not a malaria year, by the way, we had considerable reduction of malaria, but not 90 % as shown by Dr. Bass' table. The difference shows the result of effort in the area treated. In spite of this I think we must bear in mind that the ultimate control of malaria will depend upon a combination of the two methods. Engineering operations which disturb the soil do not take into consideration the effect upon prevalence of malaria. They should be under some sanitary regulations. I refer particularly to drainage district work done to drain submerged alluvial areas. The dirt is banked up so as to form local puddles and pot holes that should not be allowed to exist. I tell my classes that the therapeutic dose of quinine is a quarter of a grain per pound of body weight a day. The quantity of blood that has to be sterilized is not a question of the age of the individual, but depends on the weight. I think the sulphate should be used exclusively in epidemiological work. It is the standard commercial salt and the one persons get from the druggist when they ask for quinine. It is as effective as any other and is cheaper.

A Member—Has the recent high cost of quinine embarrassed the work? I have found in southwest Georgia in experiments of the same character that it is difficult to get quinine in quantity at a cost of $2.00 an ounce, and inasmuch as Dr. Bass' treatment would entail 560 grains, that would be about $8.00 per capita for the quinine alone. I should like to ask whether he had the same difficulty or whether he was fortunate enough to have in a supply before the rising market.

Dr. Carter—Dr. Geiger tried a small control. I suppose he will continue the discussion.

Dr. J. C. Geiger, U. S. Public Health Service, Washington, D. C.—It was on the control of malaria carriers. Indexes were taken in the spring months and those found infected were treated with ten grains of quinine sulphate, by mouth. This was continued for thirty days. The car-

rier was then supplied with quinine enough to last another thirty days, to be taken 10 grains a day. Some of the carriers continued the quinine for the thirty days additional; others were not sure. Likewise, we were not absolutely sure but of the ninety carriers which were resurveyed and continuous blood examinations made, none showed parasites in the blood, demonstrating fully that ten grains of quinine sulphate by mouth for thirty days will sterilize the blood of malaria carriers for one season.

Dr. Carter—No carriers were found in that group later?

Dr. Geiger—No, sir.

Dr. Carter—I would draw a distinction for the use of quinine as it was used in Italy from that used for carriers. We should not speak any more of "the prophylactic use of quinine." It is too indefinite. I believe that the first report of the use of quinine to sterilize the human host as a sanitary measure was by Gossi at Grosseto in North Italy in 1899. It was next used by Koch at Stephansort and later in the German possessions in Africa. This method was to give quinine to infected people to clear them of the parasites to prevent infection by them of the mosquitoes.

The method of Celli, used largely on the Mediterranean, is to give quinine to immunize men against the bite of the infected mosquito.

The one method is to prevent the mosquito becoming infected and the other is to prevent the infection of the man from the mosquito when it has already been infected.

The Italian method does not give enough to sterilize. In some places where it was used 20 % of those taking it had parasites in the blood. That is the method of quinine immunization and it is not the same as quinine sterilization. The method of quinine immunization is distinctly temporary. If the method of quinine sterilization were done all over the community it would be done once and for all until other parasites are introduced. They are comparable, but by no means the same. That is the difference between Dr. Bass' method and the Italian method.

Dr. Bass (closing)—It is improper not to speak of "quinine sterilization of the human host" as "quinine prophylaxis." The original plan for our experiments did not contemplate trying quinine prophylaxis at all. Later developments made it desirable to do some experiments along this line, and we did try giving quinine to everybody in two communities of nine square miles each. The results, however, were not as good as those obtained from curing all malaria carriers in the community and all efforts along this line were discontinued.

There is no doubt but that mosquito control would be more effective and more practical under certain conditions in certain localities than quinine control. On the other hand, it seems very certain that quinine control is also more applicable to certain localities and conditions. Though our experiments have neglected entirely mosquito control, it must not be understood that this was done because we thought it valueless. It is very apparent that a suitable combination of the different available methods would be more effective than either one alone. Quinine control will be more effective when combined with mosquito control and mosquito control will be more effective when combined with quinine control. No doubt later experiments may make it possible to select the most practical measure or combination of measures for different localities.

Our experience in towns has shown that, in some of them at least, quinine control is more difficult to carry out than it is in the rural areas. On the other hand, mosquito control, no doubt, will be found much more practical and less expensive in towns than in rural areas.

With regard to the co-operation given by the physicians of a locality in which quinine control is being carried out, our experience is that little help can be expected from them. In fact, some of the physicians in Bolivar County told us frankly that they did not expect to advise and urge people to take our quinine, but that they would not oppose it. There were certainly very few instances in which any active opposition by the physicians was heard of. Regardless of the fact that many physicians are not largely interested in sterilization of their malaria cases and prevention of relapse, and that they do largely employ spectacular and less effective methods of treatment, there is at present a healthy trend toward recognition of the importance of disinfecting their patients and use of proper quinine treatment. As a matter of fact, the treatment which we have found to be most effective is being used to considerable extent by doctors throughout the State of Mississippi.

My opinion is that the time is ripe for such a move and that the National Malaria Committee could perhaps accomplish more good by deciding upon, adopting and recommending an effective treatment of malaria and bringing that to the attention of all of the medical profession than they could accomplish by almost any other thing they could do.

With regard to the suggestion of regulating the dose according to the size of the individual and not according to age, such would be practical in private practice and might be desirable, but it is much more practical to state the dose for different ages when the remedy is to be employed in such a general way as is contemplated here, especially for public health purposes.

Quinine is the only specific remedy known for malaria, and it is therefore unwise and undesirable to combine it with other drugs which are of doubtful value or to give it in unnecessarily inconvenient form or in any special way that is not more effective. For public health work especially, we must push the proper use of quinine and omit all other unnecessary complications.

The question of the cost of quinine was raised. At the present time the retail price of quinine is so high and the difficulty in getting it in proper form is so great that not many who would like to get it and take it to get rid of their malaria actually do so. The present retail price of quinine in capsules is about $5.00 an ounce. If some agency, like, for instance, the United States Public Health Service, or possibly the National Malaria Committee, would get behind the supply of quinine and see that it was available in proper form and at reasonable price, a great deal more would be used and a great

deal more malaria would be cured than occurs at the present time.

As to development of clinical malaria while taking the quinine treatment we are using, we know of three instances where it did develop while the person was taking the treatment. These, however, are only three cases that came to our attention while treating the malaria carriers among about fifty thousand people. The importance of these three exceptions is therefore negligible.

You will no doubt be interested to know that there has been a higher per cent. of gamete carriers per given number of infected persons found during the last month or two than we have found at any time during the previous four years. I would interpret this to indicate that, in all probability, there is more transmission of malaria taking place at the present time than usual.

Dr. Carter—When your full report is given out by the International Health Board, will there be details of the treatments experimented with and the results, so that any one can tell the basis on which you have determined that the method you are using is the best?

Dr. Bass—On account of the fact that a number of the experiments with different methods of treatment were not carried to final conclusion, I think the International Health Board will consider it unwise and undesirable to publish these details at the present time. We are not certain that the best method of treatment has been determined. We do feel, however, that the method employed is the best and most practical method for this purpose that we know of at the present time.

RESULTS OF RECENT EFFORTS TO CONTROL MALARIA

By John A. Ferrell, M.D., D.P.H.,
Director for the United States, International Health Board,
New York, N. Y.

Since 1913 a number of field experiments have been undertaken to test the feasibility of malaria control, and to ascertain separately the value of each method of control with reference particularly to the per capita cost. The following are some of the experiments with which we are more or less familiar:

1. Malaria control in rice fields, by a combination of methods.
2. Malaria control by screening.
3. Malaria control by quinine sterilization of the human host.
4. Malaria control in distinctly rural areas, by prevention of mosquito production; and,
5. Malaria control in densely populated communities, by prevention of mosquito production.

It is my purpose to review briefly the experiments just enumerated and to comment upon the reported results.

1. *Malaria Control in Rice Fields by a Combination of Methods.*—The discovery of a method which is economically feasible for the control of malaria in rice fields is of fundamental importance in this and in many foreign countries. It is therefore gratifying to note that during the past two or three years, investigations have been under way with a view to finding the most satisfactory methods for dealing with this phase of the malaria problem. A progress report will be presented to the conference this afternoon regarding the results of studies conducted in Arkansas and in California.

2 *Malaria Control by Screening.*—In a rural area near Lake Village, Ark., a test was conducted in 1916 to determine the feasibility of controlling malaria by means of screening. A similar test was made at Gilmerton, Va., but unfortunately I am not familiar with its details. The Arkansas area was small and the test was conducted for a period of only one year (1916). It would hardly be justifiable, therefore, to base any definite conclusions upon the results obtained. To arrive at any fair conclusion, it would be necessary first to make these tests more extensive; secondly, to carry them out under a variety of conditions; and thirdly, to extend them under a given set of conditions over a period of three or more years.

During the year in which the work was conducted (1916), it was estimated that the amount of malaria, in the Arkansas area referred to, was reduced about 70 per cent. as a result of screening, and that the annual per capita cost of the work, exclusive of overhead expenses, was about $1.75. It was found that for one or two years immediately following the experiment, the screens were kept in reasonably good order by the tenants, who had been instructed regarding the importance of maintaining them in good repair.

*Read before Conference on Malaria (National Malaria Committee), Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C,. Nov. 10-13, 1919.

More recently, however, the screens have been seriously neglected. This neglect is partly attributable to the fact that in many instances the old tenants have been replaced by new ones, who had not received instructions as to the importance of keeping the screens in order.

A more extended study of the feasibility of the screening method of control would probably be justified. The use of screens and the hand-catching of mosquitoes within the houses, however, are individual protective measures and are less likely to be successful throughout a locality than methods of control which can be carried out as community measures.

3. *Malaria Control by Quinine Sterilization of the Human Host.*—Dr. Bass has just given the details of an experiment—begun in Bolivar County, Mississippi, in 1916, and subsequently continued in Sunflower County, Mississippi—for the control of malaria by quinine sterilization of the human host. The method has been tried in the hope that it might prove more practicable than the mosquito control plan, inasmuch as the authorities on malaria control have recognized that under certain conditions the prevention of malaria by the control of mosquito production is not economically feasible. This is particularly true in very sparsely settled localities of this and other countries where frequent overflows from rivers and small streams form extensive areas of swamps and bayous which favor the production of anopheles. The Mississippi delta is a striking example of an area of this type.

Dr. Bass estimates that in Sunflower County during 1918, in an area of about 100 square miles with a population of approximately 9,000, malaria was brought within reasonable control under average plantation conditions by destroying the parasite in the blood of the human carrier. The per capita cost, exclusive of overhead expenses, was approximately $1.16. To be sure, it is not wise to draw deductions from the results of one year's experiment. It is expected, however, that under the general supervision of the Mississippi State Board of Health, this work in Sunflower County will be continued through 1920, and perhaps for a longer period. If this be done, it may be possible to obtain valuable data for formulating a more definite conclusion.

4. *Malaria Control in Distinctly Rural Areas by Prevention of Mosquito Production.*—As will be mentioned later, the control of malaria in certain densely populated communities by the prevention of mosquito production has been demonstrated to be economically feasible. This method of control has not, however, been thoroughly tested in distinctly rural areas. Dr. H. H. Howard has outlined in his paper the plan followed during 1918 in ascertaining, in a certain rural community in Hinds County, Mississippi, the amount of malaria and the location and nature of all mosquito breeding-places. His work during the present year has been devoted to the control of mosquito-breeding under one set of conditions and in one area with observation of what occurs in similar near-by areas in which no control measures have been instituted.

The results which Dr. Howard presents are encouraging. He has done most promising work in testing in a practical way the extent to which the top minnow (gambusia affinis) may be relied upon to control the breeding of anopheles in stock ponds, streams, and other breeding places. Dr. Howard contemplates continuing his studies in Mississippi throughout 1920, and perhaps longer, under the general supervision of the Mississippi State Board of Health.

5. *Malaria Control in Densely Populated Communities by Prevention of Mosquito Production.*—Dr. Taylor has just presented the details of an experiment for the control of malaria by the prevention of mosquito production. This work was begun as an experiment in the southeastern section of Arkansas in 1916. Regarding the method under discussion, Dr. H. R. Carter, at the recent session of the American Public Health Association, presented an admirable paper entitled "A Resume of Methods of Malaria Control—Cost and Results." His paper gave the results of control measures instituted at earlier dates at Roanoke Rapids, N. C., Electric Mills, Miss., and Crystal City, Mo. I am taking the liberty of including them in the following table (see page 258). You will note from the table that in areas to which this method of control is par-

ticularly well adapted, adequate malaria control can be secured at a cost of from $1.00 to $1.50 per capita for the first year, and at a cost of from 50 to 75 per cent. of these amounts for subsequent years.

The method was employed in the main by the Federal Health Service in co-operating with state and local authorities during the World War as a means of controlling malaria in the extra-cantonment areas scattered throughout fifteen states. According to Mr. LePrince, the territory involved represented an area of more than 1,300 square miles. "The civil population and war workers who benefited," he stated in a recent paper, "numbered 1,740,000, and in addition an average naval and military force of 826,000 men was protected." You will learn more this afternoon concerning the results obtained by this method of control.

As demonstrated in the Arkansas towns referred to by Dr. Taylor, the control of malaria by the prevention of mosquito production is economically feasible under civil conditions, and it is a good business investment for any community to institute the proper preventive measures. In fact, all the work referred to under this heading has given results so conclusive that it has led eleven Southern states to adopt a program for a co-operative demonstration in malaria control in which the Federal Public Health Service, the state boards of health, selected towns, and the International Health Board will participate. It is contemplated that during 1920 operations will reach from sixty to seventy Southern communities, and that a total of from $400,000 to $500,000 will be spent on this important work.

6. *Evaluation of Foregoing Methods of Malaria Control.*—The field investigations have not as yet been carried far enough to enable us to prescribe the best method of control for every type of malarial community. The results thus far accomplished, however, would seem to justify continuing field investigations until each method of control has been thoroughly tested separately and under varying conditions. After this has been done, a combination of methods may be intelligently employed in the expectation that in due time we shall be able to prescribe for each community the best method of securing a high degree of control with a moderate per capita investment.

The quinine sterilization of the human host and the prevention of mosquito production in densely populated communities are methods which may be carried out as community measures. They are for this reason more satisfactory, where feasible,

RESULTS OF MALARIA CONTROL OPERATIONS BY ANTI-MOSQUITO MEASURES, 1913-1918

Year	Town	State	Population	Per Capita Cost	P. C. Reduction in Blood Index	P. C. Reduction in Doctors' Calls
1913-14	Roanoke Rapids	North Carolina	4100	$ .80	97	
1914-15	Roanoke Rapids	North Carolina	4100	.27	97	93.3
1915-16	Roanoke Rapids	North Carolina	4100	.24	.....	
1913-14	Electric Mills	Mississippi	1000	1.21	91	85
1914-15	Electric Mills	Mississippi	1000	.24	91	85
1915-16	Crystal City	Missouri	8000	.90	83	80
	Crystal City	Missouri	8000	.54	83	80
1916	Crossett	Arkansas	2229	1.24	72.3	97
1917	Crossett	Arkansas	2229	.63		
1918	Crossett	Arkansas	2229	.53		
1917	Hamburg	Arkansas	1285	1.45	.....	97
1918	Hamburg	Arkansas	1285	.44	.....	
1918	Lake Village	Arkansas	975	1.25	.....	95
1918	Dermott	Arkansas	2760	.54	.....	88
1918	Monticello	Arkansas	3023	.46	.....	90
1918	Bauxite	Arkansas	2500	1.11	.....	78
1918	Ruleville*	Mississippi	80000	1.08	.....	....

*Rural area.

than screening and the hand-catching of mosquitoes, as these measures depend for their success upon the personal interest and consistent co-operation of the occupants of each house. Dr. Carter illustrates this fact in the following way: "It is better to sterilize the water supply of a city than to trust to the individual to do so. Yet if the city fails in its duty, that man is wise who boils his own drinking water." As between the two community methods referred to, the character of the community in which control measures are to be undertaken would determine the method to be employed.

Experts in malaria control would favor, where practicable, the method which aims at the prevention of mosquito production. This is largely because it is simpler to deal with physical than with human problems. After the task of controlling mosquito production is accomplished, the maintenance of proper control measures is comparatively easy. The shifting of the population and carelessness in personal measures do not complicate the situation as they do, for example, in the case of the screening method. Moreover, freedom from the mosquito, both as a nuisance and as a spreader of disease, is obtained. It is unfortunate that this method of control has not yet been demonstrated to be economically feasible for many parts of the world where malaria is a most serious menace to life, health, and working efficiency.

It is proposed to try out under a wide range of conditions this and the other recognized methods of malaria control both separately and in combination. Experiments in tropical as well as subtropical regions will be included in the program. The efficiency of any measure or set of measures will be judged by the degree of control which they yield, and by the expenditure of funds which they require not only for original installation but for maintenance as well. It should be possible upon completion of the studies to announce the particular measure or combination of measures that would prove most applicable for solving the malaria problem of a given locality.

DISCUSSION

Dr. Graham E. Henson, Jacksonville, Fla.—In summarizing the two chief methods of control, I would like to draw attention to two principal factors. In so far as control of malaria by mosquito reduction or control of mosquitoes is concerned, the International Health Board may go into a community and secure its co-operation as a whole and not be dependent in any measure or only in a slight degree on the attitude of the individual. They, therefore, can accomplish nearly one hundred per cent. of what they expect. On the other hand, where a member of the International Health Board goes into a community and attempts to sterilize the human host, it matters not what the attitude of the whole community may be, if he has not the co-operation of every member of the community and every physician, he can not secure one-tenth per cent. of what he could if he had the co-operation of every individual. Dr. Bass said that some of the physicians frankly told him that as malaria was one of their ways of earning a living, they were not particularly keen about seeing it reduced.

In closing, I would like to state further that in making any deductions as to efforts of control of malaria in 1920 as based on the prevalence of malaria now, we should bear in mind, regardless of whether a community is receiving benefits of malaria control or whether left alone, that there is marked increase of malaria throughout the country and it would not be fair to deduct that control of malaria and mosquito reduction is not practical. In Florida, and from conversation with a number of gentlemen since I came here, I learn there is a decided increase in malaria this year throughout the country. What it may be due to I do not know, but the dry weather in Florida, followed by rains and protracted spells of hot weather, resulted in an unusual increase over our usual malaria rate. We were wearing summer clothes in Jacksonville until ten days ago, so that mosquito propagation was going on actively where under normal conditions it would have started to decline.

Dr. Chas. E. Lowe, Wilmington, N. C.—I wish to call your attention to a commercial organization which may be of value to public health. There is an organization in Baltimore which is known as the Southern Settlement and Development Company. This, I understand, is backed by railroad interests. Their ultimate object is development and settlement of large land areas in the South, and particularly in the coastal plain section. These men, after experimenting, have come to the conclusion that it is impossible to develop the country satisfactorily until the country itself comes to a realization of the fact that it is not suitable for development on account of hookworm, malaria, bad roads and lack of sanitation.

It is significant of the general awakening to public health questions that this is the view of a commercial organization of this character. The parent organization in Baltimore is now developing through the South state organizations under various names. In this State the organization is known as the North Carolina Landowners' Association. They are putting out intensive propaganda looking toward correction of these conditions and a very active campaign is being conducted for public education along lines of better health conditions, including malaria

control. I simply mention this that we may be in touch with these organizations. They have a great field of usefulness and because they are backed by commercial interests and present their arguments from a business standpoint, they can be of service to us. I want you to know that they are willing and ready to help us in every manner possible.

Dr. H. R. Carter, U. S. Public Health Service, Baltimore, Md.—The value of any method of malaria control and the advisability of the adoption of any method can be accurately expressed as being directly proportional to the ill it averts and inversely to the cost of averting it. It is the percentage of the reduction of malaria divided by the cost per head. Of course, when I say cost per head, I do not mean necessarily the first cost. Take it ten, twenty or thirty years and count all cost and consider the permanency also. If you reduce it for the year and do not keep it reduced, that is not as good as if it were permanent or for two, three or four years.

The two methods, which some have thought in conflict, but which are not,—these two community methods, one of human control and one of insect control, are complements of each other. One is best in one place and one in another. For each place determine the value of this fraction and from it determine what method to use. Take the country community that is full of malaria, sparse settlements where the drainage is bad, the method of control of the mosquito production will make the cost very high and the fraction will be small; on the other hand, sterilization of the human host is about the same whether people live far apart or close together, and this fraction would be bigger then and that method would be applicable to such a community. One method is suitable to fill out what the other does not. There is not the slightest conflict and nothing that Dr. Bass has said would make one think so. They go together. We shall have to wait and see as to permanence. Neither has been tried sufficiently.

One advantage of sterilization has not been mentioned. It gets rid not only of new infection, but of old. No amount of mosquito control can get rid of last year's infection, although quinine can. The same is true of the infections caused in the early spring by anopheles which have hibernated becoming active. McDonald stresses this. In no case, so far as I know, where mosquito production control has begun, has it ever been allowed to lapse. In Panama it is kept up; it has spread over the rest of Cuba, which keeps it up. In this country. Roanoke Rapids was the first place and they kept it up from the spring of 1914 to this fall, and they have no malaria. Electric Mills started in 1914 and they have kept it up. The same is true of Crystal City and of Emporia, Va. Seventeen places were mentioned and I could add seventeen more. None, so far as I know, which has once freed itself by mosquito control has allowed the work to lapse. I earnestly hope the same will be true of sterilization of the human hosts.

Permanent elimination, as Dr. Howard says, will come through agriculture. It has so come in France, England and part of the United States. Every place that is freed is permanent and will not have to be freed again. As to even temporary control, the people have that much more energy and will be enabled to take permanent measures. You have no idea how much North Carolina has freed itself. Since I first knew it up to 1913 it is fair to say the malaria had diminished sixty-six and two-thirds per cent. It came from the increased price of cotton which made people prosperous. Everything that prevents malaria, even if temporary, gives so much more energy.

Dr. Ferrell (closing)—Dr. Fricks brought up the question as to the cost of quinine and the feasibility of securing it in quantities sufficient to permit extended operations. The supply at present, I am informed, is scarce and the price high. The supply, however, in a reasonably short time, a few years at the outside, could be enormously enlarged.

Dr. Carter—We have no synthetic method of making it. It takes about thirteen years to get quinine from the cutting, and if the demand were a hundredfold multiplied, it would be fifteen years before it could be answered.

Dr. C. C. Bass, New Orleans, La.—I am informed that there is a company now arranging, or preparing to manufacture, quinine in Brazil, where there are said to be seventy-five different species of trees that yield a considerable quantity. Many of these are said to be wild species.

MALARIA CONTROL IN RURAL COMMUNITIES BY ANTI-MOSQUITO MEASURES*

By H. H. Howard, M.D.,
International Health Board,
New York, N. Y.

Many successful experiments in the control of malaria in towns and other centers of population, by antimosquito measures, have been made and reported. But few experiments have been made in its control by similar methods in purely rural sections.

As malaria is essentially a rural disease, and as a large part of the population of the Southern States is rural, it is important to give consideration to, and to develop if possible, a plan for control applicable to rural communities. This plan must not only be effective as regards the desired end, but must be of non-prohibitive cost because of the immense area to which it must ultimately be applied.

Malaria control in rural sections may be said to differ from a similar undertaking in towns, in at least three respects:

*Read before Conference on Malaria (National Malaria Committee), Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

1. In rural sections we have a scattered population, often unevenly distributed, where the area to be controlled per individual is large. This condition alone makes it difficult to maintain a low per capita cost for control.

2. In rural sections there is not a pre-existing system of drainage or proper means of disposal for storm water (as is most often the case in towns) which may serve as a foundation for our drainage work for controlling mosquito production.

3. As a rule the rural conscience is functioning less actively, and the sense of the people as regards their responsibilities in health matters is less acute, in the country than in towns, and hence the response to our efforts and the appreciation of results are probably likely to be less satisfactory.

With these considerations in view, it was determined early in 1918 to select a rural district in the hill sections of Mississippi where a campaign of observation and experimental control by antimosquito measures might be conducted.

The district finally selected is located in Hinds County, Mississippi, in a rural agricultural section, and represents average conditions as to climate, rainfall, soil, drainage, agricultural methods and products, with conditions neither more nor less favorable than the average for mosquito production. The district was approximately 36 square miles in extent and contained 172 homes housing 830 people.

The season of 1918 from June 13 forward was devoted entirely to the observation of natural conditions and the collection of data, no control measures being recommended or inaugurated. The plan of procedure was briefly as follows:

The district as a whole was mapped in detail. An individual map of the terrain for one-quarter mile in all directions from each home was made. A census of the people was taken, blood specimens were collected and examined for malaria infections, and all clinical malaria was carefully observed. All water deposits within the one-half mile area around each home, whether found producing mosquitoes or not, were listed, classified and mapped, and inspected for mosquito breeding, at ten-day intervals throughout the season. Similar attention was given to all streams, water courses and the larger stagnant water deposits. Owing to the overlapping of the one-half mile areas around the homes, it was more often the case than otherwise that the territory under observation was in blocks of considerable size and continuous from house to house. Special study was made in each water deposit of conditions which seemed to favor, retard or prevent mosquito production. A considerable number of the water deposits did not produce mosquitoes. Of these a larger proportion were under natural fish control with the top minnow, *Gambusia* affinis.

The extent of the area of observation in 1918 was approximately 36 square miles, containing 172 homes housing 830 people. The rate per cent of malaria in 1918 as ascertained by blood examinations and clinical manifestations was 21.44. Two hundred and twenty-eight water deposits were mapped, listed and classified, of which number 61 did not breed Anopheles mosquitoes at any time during the season. The 228 water deposits consisted of ponds, creeks, springs, pools, pot holes, lakes, seepage areas, borrow pits, dipping vats, wells and cisterns. It may be of interest to note the number and extent of several of the more important classes of water deposits within the district as follows:

91 ponds with an approximate total shoreline of 8,535 linear yards.

3 streams with approximately six miles of their course within the district.

1 larger stream, which formed the eastern border of the district for 6 miles, but for most of this distance the homes were situated 1 mile or more from it.

20 branches with total length of 36,800 yards. The greater part of these were simply natural drainage channels rarely containing water for periods long enough for mosquitoes to breed.

45,015 linear yards of ditches. These were the larger farm and roadside ditches, which were in large part dry except during periods of heavy rains.

2,155 linear yards of borrow pits along the public roads.

In addition to these there were a few springs, pot holes, seepage areas, wells, cisterns and dipping vats.

Adult mosquitoes were captured and larvae were collected and hatched with the result that there were identified as present the culex, A. punctipennis, A. quadrimaculatus and a few A. crucians. The punctipennis were the most numerous throughout the season. The smaller water deposits near the homes, mainly of artificial origin, as a rule produced the A. punctipennis exclusively and profusely. The A. quadrimaculatus seemed to come mainly from large ponds and water deposits of natural origin, in the overflow area of the creek valleys. Mosquito larvae were found in many places until December, and in some of the more protected water deposits they could be found on warm days until February, 1919.

At the opening of the present season (1919) control measures were applied to the greater part of the observation area of 1918, that is to an area of approximately 22 square miles, with 142 homes housing 593 people.

These measures consisted of drainage, the training of streams and ditches, clearing away brush, vegetation and debris, and oiling. The endeavor in all of these activities was to do the minimum amount of work necessary to control mosquito production effectively.

Our observations in 1918 were rather convincing that, during that season, under natural conditions, without our aid or intervention, the presence of top minnows in many water deposits led to the reduction of mosquito production to a fractional part of what it would otherwise have been.

In view of this we arranged a program early in 1919 to extend fish control to all classes of mosquito-breeding places and to test the top minnow as an agent of control, carrying the experiment as far as results would justify and our time and the facilities at hand would permit.

There were four varieties of top minnows in the waters of the district. Of these the *Gambusia* affinis was by far the most numerous, the other varieties being so few in number that they require no further mention. The *Gambusia* was found very plentiful in the two larger streams, their flowing tributaries, certain ponds and borrow pits, and intermittently in water deposits of more or less transient nature, resulting from the overflow of the large streams. In the preparation of our program for the experiment with fish control all recent American literature to which we had access was consulted, with the rather discouraging result that while many writers mention the use of certain fish to control mosquito production, stating that they have observed effective control by fish under natural conditions, only a few recommend it, and they cautiously, and none seem to write with that definiteness, confidence and wealth of detail which we hoped to find, and which would indicate either favorable or unfavorable personal experience with it. However, our plan was formulated and carried forward, being modified from time to time as we gained experience.

At first we secured our minnows for stocking purposes mainly from waters within the district where there seemed to be an excess. This proved to be unwise. Later we set aside a pond for breeding purposes from which we derived a large part of our fish. Waters outside of the district of control were also an important source of supply. Where possible, arrangements for breeding the *Gambusia* should be made the year previous to the inauguration of active measures of mosquito control, in order that a certain and bountiful supply of fish may be had at all times. The limits of this paper will not permit of a statement of our experience in breeding the *Gambusia* and the details of its use, but it will suffice to say that they multiply very rapidly—one female under favorable circumstances producing 240 offspring between April and October—and can be bred in large numbers at very small cost; they bear transportation well in water of air temperature; they are very hardy and readily adapt themselves to life in muddy water, waters with a reasonable degree of contamination from animal excreta, and in the smaller water deposits.

At present we are controlling approximately 90 % of our potential mosquito-breeding places, which could not be drained, with the *Gambusia*. These include water deposits of all kinds and sizes, such as ponds, ditches, pools, pot holes,

borrow pits, creeks, cisterns and shallow wells. In the creeks stocked with *Gambusia* we have not found mosquito-breeding to occur to any great extent in the creek channels, and what does occur is usually found in collections of trash and debris of a rather permanent nature. We attribute this to the fact that the mosquito larvae in these places are not only protected, in a large measure, from the minnows, but to some extent are safeguarded also from being carried out with the current during the sudden freshets to which the streams are subject.

In a quarter-mile section of the largest stream in the district we have maintained effective control along the channel of the stream with fish alone, with but small expense for clearing away brush, vegetation and debris.

The streams of the district are tortuous and of sluggish flow and are quickly affected by heavy rainfalls which cause them to overflow their valleys. When the waters recede there are left behind many deposits of water in the low places. These are most pernicious breeders of mosquitoes (as a rule containing no minnows) unless they are of unusual size and of a more or less permanent nature. It is not practicable to use fish in such places because at each overflow they would escape into the streams.

It is hoped that a survey of these streams by an engineer will show that it would be profitable from an agricultural point of view alone to undertake a comprehensive drainage scheme which would involve the straightening or canalizing of their channels and such other drainage as might be needed in the swamp lands along their courses. This would not only greatly reduce the area of potential mosquito-breeding, but would render favorable for fish control that which remained.

The number of top minnows necessary for the effective control of mosquito production will vary according to the nature of the water deposit, its shore line conditions, the available food supply for the fish other than mosquito larvae, the presence or absence of predatory fish or other natural enemies of the minnows, and probably also the number of female mosquitoes visiting the water for ovipositing. For practical purposes, and to obviate the necessity for attempting close calculations on uncertain grounds, we have adopted the following plan:

Our inspections for mosquito breeding are made every ten days. When our inspectors find mosquito larvae in a water deposit under fish control we have found it safe to attribute their presence to one of two conditions: either an insufficient number of fish, or the presence of too much vegetation or debris. The remedy, consisting of either the introduction of additional fish or the clearing away of vegetation or debris, is applied at once. Theoretically it seems that we should endeavor to keep the number of minnows in each water deposit slightly in excess of a full food supply, and this is probably very nearly accomplished by the above procedure.

Among all known measures for mosquito control, drainage of a permanent character is deservedly given first place. However, it is a recognized fact that not all water deposits can be drained and thus effectively and permanently disposed of.

It is the impossibility of attaining the ideal which has driven us to the adoption and use of measures of control the results of which are too often scarcely prolonged beyond the period of their application. Of these measures of control, oiling, probably the most temporary of all in its results, has been considered the most effective under favorable conditions, and has consequently been the most widely used. While it is not our purpose to decry the use of oil, nor to under-estimate its value to meet emergencies, yet with the price of oil high, and very high labor cost for its distribution, and the preparation and maintenance of the field conditions necessary for its successful use, it behooves us to give due consideration to promising, less expensive and possibly more permanent measures of control, especially when we contemplate operations in large areas.

Not only is oiling as a measure of mosquito control expensive and very transient in its results, but its effectiveness is subject to very definite limitations which are too often lost sight of.

In Reprint No. 260, Public Health Reports (page 6), Mr. LePrince sets forth some of the limitations of oil as follows:

"It is not advisable to oil water when the film

will not remain effective, as just before rain storms. During rainy periods the value of oiling is decreased. The ability of the larvae of mosquitoes to live under an oil film for an hour should be considered. Oil films will not penetrate a barrier of grass in water or move around similar obstructions.

"When such obstructions to the oil film occur on the water surface and are not removed, sufficient oil must be used to cover both the obstructions and the spaces between them.

"Wind will break up an oil film and transport all oil to one shore of the body of water."

When we consider how often these limitations alone may operate to the undoing of control by oiling in a large rural district with extensive breeding areas of every variety and condition, and how constant and thorough, and correspondingly costly, must be the system of inspection and supervision necessary to prevent such a contingency, we could not view the future of mosquito control with confidence if oiling should be made our main dependence, secondary to drainage.

Some of the following apparent advantages of fish control as compared with oiling may be of interest:

A. Fish Control Less Expensive.—The petroleum mixture we are using (3 parts kerosene to 1 part crude oil) cost us some weeks ago 18.1 cents per gallon f.o.b. The top minnows, in this section, where they are indigenous, cost nothing except the labor of capture and transportation. The methods of preparing bodies of water for oil control and fish control are much the same. However, it has been made very evident to us during the present season that top minnows will maintain effective mosquito control in the presence of debris and vegetation which would render oil ineffective. Thus both the cost of preparation for oiling and the cost of maintenance may be higher than in fish control. Oil must be applied every 7 to 10 days in dry weather, and oftener in windy or rainy weather. One stocking with minnows will suffice for an indefinite period in water deposits of a permanent nature, and as a rule for a much longer period than a single oiling in any water deposit.

B. Fish Control Less Subject to Accidents.—The effectiveness of the oil film is quickly destroyed by wind, rain and wave action, natural phenomena of frequent occurrence, which have practically no effect upon the minnow as a control agent.

C. Fish Control More Permanent in Its Results.—As has been remarked before, oiling as a control measure is transient in its results, and to be effective must be regularly and continuously applied. If discontinued probably no lasting benefits come from its previous use. The general stocking of the waters of any mosquito-infested section with the top minnow results in immediate and material reduction in mosquito production, and it seems evident that this step alone, even should other activities cease, will continue indefinitely to operate against mosquito breeding, unless disease, natural enemies, or some piscatorial tragedy lead to the extermination of the top minnow.

While we realize that our experiments in fish control are not extensive enough either in time or area to justify positive and definite conclusions, yet the results have been of a nature to render us quite hopeful for the future of fish control.

INCIDENCE OF MALARIA

In 1918, up to October 1 we had in the present area of control a rate per cent of clinical malaria of approximately 16½.

In 1919 in the same area under control measures we have had up to October 1 a rate per cent of only 3.7.

Not all of this reduction in the amount of malaria in the area should be attributed to control measures, as the incidence of malaria in non-control territory has been less this season than last.

COST

For the three-quarters of the present year ending September 30 our per capita cost for the district has been $4.10. The expenditures of the last quarter will be comparatively small, as we have reduced our force and conditions in November, and December should require less attention.

This has been an experimental campaign in which per capita cost is expected to be quite high, and in which there were many items of expenditure that may be eliminated in the future.

Fish control could be extended but slowly for lack of top minnows, and in the meantime more expensive methods of control had to be used. One step alone, which is quite feasible and would most

naturally occur in future campaigns, will very materially reduce the per capita cost. I refer to an increase in the subordinate staff which would enable us to cover a much larger territory and population with the same cost for direction and supervision, which has been our heaviest single item of expense. A very material saving is possible in undertakings of this sort if the work is planned on a basis of a certain period of years, so that it is not necessary to make complete control an objective of the first year.

I think that most of those who have given much thought or study to the question of malaria control in the great rural areas of our Southern States must have consciously or unconsciously formed in their minds a picture of the future of malaria control in these sections. To me it seems both practicable and feasible, with the knowledge we now have, to accomplish our purpose possibly somewhat along the following lines:

Secure the canalizing of streams and the drainage of swamp and seepage areas by community action, approaching the subject, and presenting it to the people, solely from an agricultural point of view. Most of our states have laws providing for the establishing of drainage districts and the issuing of bonds to provide funds for such undertakings, and already quite a number of communities are taking the matter up on their own initiative.

With the greatly reduced water area which would directly result from this step and the improvement in general drainage which would follow as a secondary result, the problem of mosquito control would be much simplified and cheapened, especially if the use of the top minnow proves applicable on a large scale.

By combining with the above the use of quinin—both in the treatment of carriers and as a prophylactic in special cases—the use of screening, oiling, the catching of adult mosquitoes,—by bringing to bear every known method of attack on the mosquito and the malaria parasite which will secure results justifying its cost—we may have success, and at a per capita cost much less than the financial loss resulting from the disease.

DISCUSSION

Mr. H. W. Van Hovenberg, Texarkana, Ark.—We used minnows in Dallas, Texas, in 1916, in connection with malaria control of Oak Lawn Lake, an artificial pond in a fine residential district. We did not have to stock this lake with minnows, however, but obtained our control by raising and lowering the water level at the dam, and by clearing banks of weed growth. We had perfect control. In another section of our Dallas work, we used fish in control of mosquito breeding in an area of two acres of water cress and had perfect success.

In our East Texas work, we find that minnows will work for us in the large streams, say with a surface of three feet or more, but that in the smaller streams, the weed growth is so rapid that it is easier for us to use oil control. In probably seventy-five per cent of our streams, we are obliged to use oil control, rather than to depend on much assistance from fish.

Mr. J. A. LePrince, U. S. Health Service, Memphis, Tennessee.—I think that Dr. Howard has explained a plan which will be very successful under topographical conditions similar, or somewhat similar, to those that obtained in Hines County, Mississippi. I believe that there are many thousands of square miles of territory similar to his where the method can be applied to advantage, supplemented here and there by oil. As I understand it, his idea is so far as possible to use this method where fish will and can replace oil treatment and not use the fish where it wouldn't be effective, that is, doing the clearing of vegetation, debris and maintenance work and then using the fish in place of oil. In regard to fish control work, I would like to mention a few places where it is used, not altogether as indicated in the paper just read, but for local control purposes.

On the Isthmus, we had fish brought from Jamaica planted on the upper edge of where Gatum lake was to be. I have not been back to see the results.

In Norfolk, Virginia, the water supply is obtained from a series of lakes. The operating force of the water supply plant was seriously affected by malaria fever. They had difficulty in operating the plant because there was so much malaria in the vicinity. By using the inlets of the lake for fish hatcheries and feeding the *Gambusia*, the mosquito production in the lakes was prevented and the malaria at that plant was decreased so that they had no further trouble from it.

Recently, in the past two years, considerable fish control work has been done in Augusta, Georgia. The results of the Georgia work are published and will be of interest to those who care to see it. A very unsuccessful effort has been made recently at that point to have the local authorities care for the clearing of the vegetation interfering with *Gambusia*, and consequently we shall have history as to what happens when vegetation is not taken care of. Nature probably reasserts itself and takes care of the Anopheles. I might mention in addition, that Raleigh, North Carolina and Atlanta, Georgia as well as Augusta

and Montgomery, have established fish hatcheries which will assist in the control work. There are conditions under which fish will prove unsuccessful. We often find that where the water is deep the game fish are present and the *Gambusia* are wise enough to keep in shallow water where the enemy cannot get them. We therefore find shallow places where there are no mosquito larvae. But how about the floatage in deep water? It must be periodically removed.

Regarding the efficiency of *Gambusia* control in rice fields, that has been touched on. They have a way of getting where they want to and not where we want them to remain, but we may be able to change that condition after proper study and observation.

Dr. Howard (closing)—In regard to the rate of malaria in Mississippi being lower this year than last, my statement was based on physicians' reports and also on reports secured from rural sections near where we are conducting our control work. The indications seem to be that up to this date the malaria in 1919, as shown by clinical symptoms, has been only about 65 % of what it was in 1918.

As regards the control of mosquito production in streams by the use of fish, I would say that the streams in the rural section where we have been experimenting usually stop running in August. Afterwards, until the fall rains begin, they consist of a series of pools. These pools are as a rule stocked with *Gambusia* that maintain perfect control. These streams, of course, contain *Gambusia* naturally. Several times we have had to readjust the number of fish in certain pools to obtain complete control of mosquito production. In August and September the fish are quite as effective in maintaining control of mosquito production as at any other time of the year. I am emphasizing the use of minnow control, but not to the exclusion of any other method. Where it can be applied it is good because it is cheap. However, the malaria problem is so large and so difficult, and so taxes our ingenuity, that we should not overlook a single possible method of control.

Mr. LePrince refers to the use of minnows in deep water. I quite agree with him that at the edges of cliffs and along steep banks the *Gambusia* might not be effective because of their fear of large fish, which would deter them from frequenting these places. In ponds used for breeding minnows I have used eight-gauge wire netting to wire off the shallows, which furnishes the smaller fish with a place of refuge and protects them from attacks of larger fish. It is quite likely that the *Gambusia* practice cannibalism when food is scarce. The number of minnows necessary for control would somewhat depend upon the amount of mosquito breeding which was taking place and the amount of food other than mosquito larvae which might be had by the fish. In one instance in our experience we felt quite sure that in a certain pond we had a surplus supply of minnows. The number averaged probably 65 to 75 *Gambusia* to the linear yard of shore line. We took some of these fish away to stock other places. At the same time the owners of the fish pond stocked it with 2,000 young bass and an aquatic plant, known as the Floating Primrose Willow, which comes to us from the tropics, was accidentally introduced into the pond. After we had reduced the number of minnows by removing them for stocking other places, the young bass also began to feed upon them and the growth of the aquatic plant added to the difficulties of the *Gambusia* in getting access to the shore line, with the result that mosquito breeding, though it was slight, occurred.

SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

SURGICAL RESEARCHES DURING THE WORLD WAR*

By George W. Crile, M.D., F.A.C.S.,
Cleveland, Ohio.

Every surgeon who saw active service in the great War had remarkable opportunities for testing out his own ideas of treatment on a large scale. So vast was the field that in traumatic surgery the concentrated and accumulated experience of this brief period was greater than the experience along the same lines during the past one hundred years. It follows that during these months many new chapters were opened, some were closed, and some discarded, while some were completed, and their subject matter stands to be passed on to the benefit of civilian practice.

It is very difficult to visualize the scale on which surgical opportunities were presented. During many campaigns operating tables were in use constantly day and night, and in a single week — a single day—there might be presented to the surgeon every type of injury; comparative methods of technic and of treatment could be tried out on many patients and the results correlated and investigated, the truth established and the false discarded without delay.

Out of this vast experience we can select but a few of the outstanding achievements, those in particular which have an important bearing upon civilian surgery as well.

SHOCK AND EXHAUSTION

Perhaps the prime outstanding problem was that of shock and exhaustion. In base and field hospitals of Great Britain, France, Italy and the United States, in university laboratories at home and in France, surgeons and research workers attacked this problem, and at the operating table and in the hospitals every possible theory proposed was examined in the light of mounting experience.

First of all, this war produced unquestionable evidence that almost as overwhelming a degree of shock may be produced by psychic as by traumatic causes. It was established—as had been supposed before—that the amount of shock produced by a given wound depends upon the area and the location of the involved tissue. New methods of treatment were proposed, tried, and eventually discarded; no effective new line of treatment proved of permanent value. After many researches and a large experience the one promising new method of sustaining the blood pressure was the intravenous injection of gum acacia, but this was finally discarded by our Army, in part because of a number of unfortunate results. During the campaign in Flanders in 1917, I had the opportunity of serving in casualty clearing stations in the front line which cleared 66 per cent of the total number of between 700,000 and 800,000 wounded in the British Army in that campaign. In these casualty clearing stations we tried out every possible method that has been proposed for the treatment of shock, and finally adopted those which had proved their efficiency before the war — physiologic rest, heat, morphin, fluids, blood transfusion. Finally, the findings of surgeons and research workers in the various laboratories at home and in the field were discussed by the Interallied Surgical Conference, which placed the final stamp of approval upon the combination of these agencies as presenting the most effective treatment of shock as well as for the prevention of shock.

ANESTHESIA

Sir Anthony Bowlby, the Chief Medical Adviser of the British Expeditionary Forces, after observing the comparative effects of ether and of nitrous oxid anesthesia in thousands of operations, advised

*Public address, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

the adoption of nitrous oxid as the anesthetic of choice in the British hospitals. This anesthetic was already the anesthetic of choice in the American Army, and was later adopted by the French. Colonel Cabot and a number of French surgeons proved again, if further proof were necessary, the value of local blocking of the lower spinal cord in amputations of the thigh, which had previously carried such a heavy toll of mortality. A comparative study by Cabot of the results of ninety amputations of the thigh with ether anesthesia alone, performed in the ordinary way with ninety consecutive amputations with spinal blocking with novocain, showed a complete reversal of his mortality rates. In the latter series, instead of losing three, he saved three out of each four cases.

The objection to the use of blocking of the spinal cord, spinal anesthesia — even low spinal anesthesia—was that even if the patient were not shocked at the time of operation, especially if there had been hemorrhage, dangerous fall in the blood pressure would follow. Colonel Cabot overcame this danger by making a preliminary transfusion of blood. In both the British and American service, however, we found that nitrous oxid and oxygen without spinal blocking was as effective a preventive of shock as spinal anesthesia and eliminated the possible resultant danger of low blood-pressure. In regard to anesthesia, also, therefore, no new fact was elicited, but pre-war findings as to the value of nitrous oxid-oxygen as compared with other anesthetic methods were confirmed.

TRANSFUSION

The prime lesson regarding the transfusion of blood which should be applied in civilian surgery is that we must never wait for the condition of the patient to become critical before a transfusion is made.

The value of early transfusion was repeatedly demonstrated in our war hospitals. A splendid contribution was made by Dr. Robinson, of the Harvard Unit, who worked out a plan whereby blood could be grouped, withdrawn and kept sterile, so that at any time within ten days or two weeks it could be available for transfusion. Following this method in some of their later campaigns, the British used to draw a lot of blood and take it forward in receptacles, so that it might be ready for the day of the attack. To their great regret, during an offensive the Germans captured a lot of this perfectly good blood. We always hoped that they would get the numbers wrong, so that if they used it, it would be improperly grouped and anaphylaxis would follow!

As for the treatment of hemorrhage, nothing new was learned, excepting the one point referred to above—not to wait until the patient was in too critical a state before giving a transfusion of blood. Blood transfusion proved the most valuable specific remedy, just as every one knew it would be.

INFECTIONS

In the prevention and the treatment of infection, real progress was made. In particular, the work of Carrel and of Dakin, especially the latter, has marked a very great advance in the handling of infections—an advance which is found to have a most important bearing upon methods of treatment in civilian practice. In every part of this country there will be many civilian patients with recessed infections with empyema, who will owe their lives to the knowledge which has resulted from the researches of Carrel and Dakin. Their work, as you know, was backed by the Rockefeller Institute. And in view of their achievement it may not be out of place to say here that if there is any layman present who wants to know what to do with his money, let him finance some line of experimental research in the community in which he lives or in some university and thus assure the attainment, in times of peace, of knowledge which will be of value not only for times of peace, but also for war.

It would be useless to discuss the great number of methods that were tried out for the treatment of infection. In the first place, during the early part of the war, it was believed that all the infections in a wound could be overcome by a massive sterilization, but trial and error soon proved the ineffectiveness of the strong chemical antiseptics.

Here once again war experience emphasized and added cumulative evidence to pre-war findings, for we found that the

one efficient defense against infections is the defense that is possessed by the body itself. All external methods are but adjuvants.

Hundreds of trials in the front area proved that no matter how favorable the wound appeared to be, primary union could not be secured if the patient were in deep shock, in great exhaustion from cold, or hunger, or starvation, or overexertion in fighting. Whenever the patient was in shock or exhaustion, the local tissues had suffered a decline in their natural defense and, therefore, even a slight infection produced disastrous results.

On the other hand, in strong, unexhausted young men, wounds containing many bacteria could be closed and the wound itself would be its best antiseptic. Furthermore, it was proved that as compared with an open wound, a closed wound took care of infection in a very short time. In other words, a biologic closure of the tissue gives the tissue the greatest power of overcoming infection. It follows that the defense against infection depends not only upon the general condition of the patient, but also on the local resistance of the involved tissues. A tight bandage, a tight splint or a tight ligature that interferes with blood supply is bound to interfere with the power of defense of the part against its infection. A foreign body that comes in contact with living tissue will devitalize the point of contact and therefore infection will progress rapidly at that point. We found that if a fragment of bone in a compound fracture was not held quietly, but by continuous movement goaded the soft tissues, infection was inevitable. It was also found that it was absolutely necessary to dissect out with the greatest possible care every bit of devitalized tissue and most carefully to prevent any pooling of wound secretions. In the latter case, the wound secretion became an inanimate body which interfered with the biological defensive response of the tissue. The successful treatment of infections, therefore, involved methods which would increase and restore the vitality of the patient and those that would promote the resistance of the involved tissues.

If the wounded man were in shock or hemorrhage or exhaustion, a transfusion of blood would immediately increase his vitality and thus augment his means of defense. Again and again the following sequence of events would result from a transfusion of blood in a wounded patient:

First, the patient that night, or immediately afterward, felt better; that night he slept better; the next morning he had a better appetite for breakfast. As a result of increased intake of food he had more calories. As a result of increased calories, he felt better and a second transfusion tended to stabilize this cycle. If, after a period of ten days or two weeks, the patient slipped back, still a third and a fourth transfusion were given. In the American Army a large number of men with huge wounds, involving vast areas, were thus treated, and better granulations and lessened discharge progressed simultaneously with the general improvement of the patient.

In the old Harvard Unit, hundreds of transfusions were made for such therapeutic purposes at No. 22 in particular, as well as in other hospitals. In this connection a research undertaken as the result of a side observation upon grouping produced interesting results. Dr. Shawan, of Base Hospital No. 4, in service at No. 9 General Hospital, B.E.F., recalled that in certain cases in Lakeside Hospital, while he was Resident, a skin graft would fail to grow without any palpable reason. It occurred to Dr. Shawan that perhaps skin grafting obeyed the law of grouping. He tried it. Through the courtesy of the British, thirty-five guillotine amputations of the thigh were transferred to him and all were kept under his care until his study was completed. In this period he grouped the blood of various Tommies with that of his patients and made grafts according to this grouping. The results proved beyond all question that skin grafting follows the law of grouping.

As for antiseptics, various more or less valuable findings were made. One British product in particular, acriflavine, proved of peculiar value because of its property of holding a wound, even an infected wound, *in statu quo* for about two days. This antiseptic was used in thousands of cases and it was found that if a wound received preliminary treatment at the front, and was then dressed with acri-

flavine, it could travel to the Base without extension of the infection or any change.

On the other hand, it was found that when used for longer periods, i. e., more than two days, acriflavine tended to interfere with healing.

Since my return to civilian practice, I have found acriflavine of great value in multiple stage operations when it has been desired to hold a wound open for from twenty-four to forty-eight hours. During this period the wound remains unchanged and the operation can proceed as if there had been no interval. Acriflavine is not toxic; it is not in any sense an irritant; apparently it stains the nuclei and in some way not yet understood it interferes with both cell and bacterial growth.

PENETRATING WOUNDS OF THE CHEST

The lessons learned regarding the treatment of penetrating wounds of the chest were many, and have been excellently summarized by Dr. Yates, whose own researches were of outstanding value. We shall not discuss these researches at this time, however, since the results—and this is true also of war findings in the surgery of the joints—are not entirely applicable to civilian surgery. The soldier for whom chest or joint surgery is demanded is hardened by his training, his out-of-door life. The civilian, on the other hand, whose chest must be explored, excepting in certain cases of industrial accidents, is weakened by disease, and consequently the methods of war may not prove of value in the latter case.

SURGERY OF THE ABDOMEN

In abdominal surgery, on the other hand, many of the important lessons learned from the enormous number and almost infinite variety of abdominal lesions which were observed, have immediate bearing upon civilian surgery. Various methods were tried by different surgical teams and the results compared. We found that the direction or the length of incision through the abdominal wall mattered little, if at all; that the prime need was a sufficiently ample exposure to secure complete accessibility, and, of prime importance, that *speed and accuracy* very largely determined the results. It was the often-repeated dictum of General Wallace that the surgeon who could not open the abdomen, perform the necessary operation and close it in twenty-five minutes should be given another assignment, because the more protracted the operation the higher the mortality.

The value of water in cases of abdominal lesions was repeatedly manifested. It was found that these patients required very much more water than we had ever before realized. Moreover, civilian observations as to the comparative value of different routes of entry were confirmed. Captain Robinson, and previously the British, in particular, made very careful comparative observations upon the retention of water in the body when introduced by various routes—intravenous, subcutaneous, through the mucous membranes.

It was found that when water was given intravenously it very rapidly left the circulation and the body, while on the other hand water introduced through the biologic path—the mucous membranes—was retained in the body in very much larger quantities. As stated above, this was in accord with civilian observation. In brief, the findings in abdominal surgery, as approved by the Interallied Surgical Conference, may be summarized as follows:

1. The anesthetic of choice is nitrous oxid combined with local anesthesia (anociation).

2. The best treatment for hemorrhage and shock is rest, fluids, morphin for pain, and blood transfusion.

FRACTURES

Perhaps more than in any other field, the greatest benefit to the civilian from the surgical experiences of the war will be found in the treatment of fractures. Before the war in our university clinics and in our leading hospitals, surgeons were primarily interested in problems of the abdomen, of the brain, of the neck, in the problems of cancer, etc., and were less intimately concerned about the treatment of fractures and wounds. It was a surprise to me the other day to hear that in one year in the United States 700,000 wounds were received in industries. That is more than the number of wounds received by our troops in the war. It certainly follows that any lessons learned in the field regarding the treatment of wounds, infected wounds in particular,

and fractures must, if we are true to ourselves, accrue to the benefit of the public at home.

First of all, in the treatment of fractures, we learned that any methods of treatment which compressed the part and interfered with the circulation must be discarded. This meant the elimination of the coaptation splint. Interference with the circulation means interference with defense against infection, which in turn means delayed healing.

Perhaps one of the greatest surgical feats of the war was that achieved by a group of young men in one hospital in which during the period between March and November, 1918, 1,700 compound fractures of the femur were treated. I visited the hospital frequently and was personally acquainted with the consultants who made the final reports. In brief, this is what was accomplished:

The cases were received on an average of from one to two days after the injuries had been received; of course every case was infected. From among these 1,700 compound fractures of the femur, 8 per cent were lost; in 18 per cent primary union was secured; there were amputations in 9 per cent of the cases; and finally, and most important of all, there was *no shortening!* Not only was there no shortening, but it was proved that whether or not shortening or lengthening will result in any given case is a matter of judgment in technic. Moreover, by the use of a movable x-ray plant, these surgeons were able to remake the anterior bowing of the femur. They used no coaptation splints, no circular bandages. They had no rule about anything, but individualized each case. In that series of 1,700 cases, 220-odd transfusions of blood were made. In any case that was not doing well, an early transfusion was given. Nitrous oxid-oxygen was used wherever an anesthetic was needed. To the fullest degree possible, the hygienic surroundings were adapted to the patient. In brief, the crux of the whole scheme of treatment was to interfere as little as possible with the defense of each man against his injury and to build up the patient's resistance as far as possible.

The summaries given above, as has been stated, are drawn from observations and studies in the Interallied Armies, especially the British and the American. It may be added that it fell to the lot of the consultants to learn a good deal regarding the German methods, and it was a matter of a good deal of pride and satisfaction to all of us to find that in the treatment of the wounds of war, at least, the *efficient* enemy displayed no particular initiative. In fact, General Bowlby told me that as far as surgical advances were concerned, the enemy had practically remained stationary during the war.

Finally, it may be added that it was a great gratification to find that the high type of surgical work which characterized the American Medical Service was due to the American characteristic of pliability. American surgeons all went over there to learn the job; to learn war surgery. We were in the biggest school of surgery ever created. It was my privilege to be a student in that school and to see much of the work of the other students, and upon the basis of these observations, and with all due justice to the splendid work of our Allies, I may still say that the work of the American surgeons was as fine as any that I saw in France.

UNRAVELING THE MYSTERIES OF RIGHT-SIDED ABDOMINAL PAIN IN THE FEMALE*

By J. N. Baker, B.A., M.D., F.A.C.S.,
Montgomery, Ala.

Unquestionably the most fertile field in the human body for mistaken diagnoses lies on the right side of the abdomen, extending from the last rib down to the pelvic outlet. This picture is at once rendered more complex in the female by reason of the fact that the important generative organs of this sex are buried within the peritoneal cavity, as contrasted with their extra-peritoneal location in the male.

To make a diagnosis of an orchitis is simple, and is likely to be correct; but the prudent surgeon should hesitate dogmatically to assert upon his first examination and before a careful review of all the possibilities that any given pain or symp-

*Read before Southern Surgical Association, New Orleans, La., Dec. 17, 1919.

tom-complex is the result of an "ovaritis" or of "ovarian neuralgia."

The slow evolution and gradual unfolding of the diagnostic pitfalls which haunt this locality have been a theme of intense interest to many conscientious workers, who, after years of ceaseless toil and of broad clinical experience, sit down to carefully and properly evaluate their surgical endeavors by the relief—permanent and enduring—afforded the patient. Is it not upon such painstaking analysis as this that the ultimate fate of any surgical procedure undertaken for the relief of human suffering must rest? Measured by this standard, very many of the surgical devices, even though fathered by men of note and ability, have failed to perpetuate themselves and have justly been relegated to the limbo of obsolete practices.

Both apology and explanation should be made by the surgeon who boldly rushes in to anchor the low and movable, yet innocent, kidney of the general visceroptotic; or by the surgeon who, after a cursory survey of the patient and discovery of tenderness in the right iliac fossa, and in defiance of a history of definite acute attack, proceeds to incriminate an inoffensive appendix for years of right-sided distress. The final outcome of such expedients can but be heartrending alike to surgeon and patient, for they neither correct existing pathology nor bring the desired relief.

The knowledge which is now at the surgeon's disposal for the accurate determination of the various lesions likely to occur in this locality is ample and varied and is not the product of a single mind or of a single generation.

The first ray of light was shed on this subject more than a century ago when Ephraim McDowell did his first deliberate ovariotomy for ovarian cyst, thus proving that the female pelvis, while entitled to respectful consideration, yet could be assailed from without.

Then followed the "antiseptic era," inaugurated and perfected by Lord Lister, whose untiring efforts placed, for the first time, surgical technic upon a scientific and rational basis. A strict adherence to these antiseptic principles broadened the scope of general surgery and wrought marvelous change for the better in such operations as amputations, lithotomy, and the like.

However, the peritoneal cavity was still sacred ground, not to be trespassed upon save in the gravest emergency.

In 1885, Reginald Fitz, of Boston, presented his classic paper on appendicitis, based largely upon dead house evidence. Four years later, in 1889, McBurney, of New York, deliberately attacked an acute appendix prior to abscess formation, and thus paved the way for the new era in abdominal surgery.

The battle is now on. The bold and intrepid surgeon quickly comes into his own. The right-sided pain—the constant companion of the average female — must be made to vanish quickly, being due, in his opinion, solely to one of two causes—either to a "chronic appendix" or to an "inflamed ovary." In case of doubt, says he, remove both, for surely the easy approach to and their close juxtaposition warrant such a procedure.

Witness now the merciless slaughter of innocent appendices and the never-ending line of eternally sterile women because of their "scirrhous" ovaries; and yet, with relief seldom lasting longer than the enforced recumbent posture might explain. Upon the return of the same old pain in the same old locality, a different surgeon is consulted, who finds that "adhesions" have formed at the site of the former operation; or perchance that a "loose kidney" is to be incriminated. Whereupon ensues more surgery; not so mutilating, perhaps, but quite as ineffectual in so far as relief to the patient is concerned.

Necessity has been dubbed the mother of invention. Whether this be true or not, it was, nevertheless, at this stage in the development of our surgical knowledge that two agencies, destined to revolutionize and to reshape our former concepts of the pathology possible in this area, were given to the profession. One was the x-ray; the other the cystoscope.

So illuminating, so clarifying, so helpful have these agencies proven in the effort to solve properly and definitely the hidden tangles of this maze that no surgeon is longer justified in employing the "hit-or-miss" tactics so common a decade or so ago, and which unfortunately are even

now too frequently practiced. Before sentence is passed incriminating any given organ, all available evidence must be assembled and carefully weighed. This means that a study, possibly extending over a period of several days, and combining the efforts of as many special workers, will have to be made before proper and final judgment can be passed.

The first and most important step in the effort to arrive at sound conclusions is the history—carefully and sequentially recorded by the surgeon himself, and going back to the very incipiency of the trouble; for, let it be recalled, we are now dealing primarily with chronicity. Careful search must be made in this long trail for acute "flare-ups," the proper interpretation of which will, oft-times, serve as valuable guide-posts. That is to say, was the acute condition, as unfolded by the history, attributable to the appendix, to the tube or ovary, to a renal colic, to a pyelitis, to a ureteral stone or stricture? A painstaking history seldom fails to reveal one or more acute exacerbations which point the way to the organ involved, whether digestive, urinary or reproductive.

One should always hesitate to hold responsible an appendix for chronic right-sided pain whose history does not unfold definite acute attacks; nor should too much importance be attached to the roentgen-ray findings of a distorted and stagnant appendix whose history fails to reveal either acuteness or reflex digestive disturbances. In some instances of chronic right-sided distress a sagging and ptotic condition of right kidney, cecum and ascending colon would seem to satisfactorily explain the mischief. An eternal tug is exerted by a stagnant and weighty cecum which, in turn, tends to drag down the kidney overhead, thus producing morbid changes in the renal circulation and drainage. Where such a picture exists, the appendix should in no sense be considered as the causative factor, even though it presents evidence of pathologic change.

Or, the reverse pathologic condition may obtain: instead of a ptotic and dilated condition of the cecum, one may encounter a mal-descent or partial rotation of the cecum, which is bound down and otherwise distorted by bands, either congenital or acquired, or both. This gives the picture familiarly known as "Jackson's veil" or "Lane's kink." Here, also, the appendix may show inflammatory changes, but can not be held primarily responsible.

It is to this class of patients that most careful study should be given. The employment of both the x-ray and the cystoscope is mandatory. If the genito-urinary tract can be shown to be pathology-free, then, and not until then, is one justified in making his attack upon the intestinal tract. The mere removal of an appendix neither suffices nor brings relief. This is evidenced by the host of sufferers still clamoring for help and who present neat scars over McBurney's point. Liberal incisions should be employed, a careful survey of the entire area made and all needed surgery applied.

The more one studies this large and interesting group, the more convinced he becomes of the very important role played by pathologic lesions of the urinary tract in the production of the symptom-complex presented. As the horizon of our knowledge broadens, fewer and fewer of these cases are consigned to the neurasthenic scrap heap. The scrawny female, no less than the buxom lassie, may harbor real pathology, if only care be taken to unravel it.

The truth is just beginning to be thrust home as to how frequently obstructive lesions in the ureter, with the concomitant damage done the kidney overhead, may be held accountable for just the train of symptoms now under discussion. Hunner, of Baltimore, to whom we owe much for his pioneer work on ureteral stricture, contends, and I believe fairly, that this lesion is one of the commonest causes of abdominal symptoms in the female; and further, that unrecognized ureteral stricture provokes more needless and fruitless surgery than any other pathologic lesion.

The symptoms manifested by ureteral stricture, while at times prodigiously protean, yet, on the whole, are fairly typical and constant. The pain is variable both as to location and severity, centering most often at the site of the ureteral inflammation, whence it sprangles out, either up, down or laterally. One of the most frequent complaints elicited is a dull, boring

pain through the hip and pelvic bone. One patient recently seen who had a marked stricture with a pelvis dilated to 30 c. c. had been treated for arthritis of the right hip joint, and had had the appendix and right tube and ovary removed and the kidney anchored.

The character of the pain resulting from a strictured condition of the ureter varies from the agonizing and intolerable pain of a stone to the growling and easily bearable pain of a sore tooth. The discomfort and the tenderness are practically always accentuated by the menstrual engorgement; and, as most ureteral strictures are located in the lower or broad ligament area (about 90 % are to be found in the last three inches of the ureter), the frequent error made of mistaking the lesion for one of the ovary or tube is scarce to be wondered at. Undue exertion or excessive physical fatigue are likewise prone to magnify the discomfort or even to precipitate an acute exacerbation indistinguishable from that of a ureteral stone. As the lesion progresses, obstructive symptoms are likely sooner or later to supervene with a resultant hydronephrosis or pyelitis and an almost constant and persistent loin pain.

It is interesting to contrast the radiation of pain in ureteral lesions with that of a chronic appendix. In the latter case, radiations, if present at all, will likely be upward and inward toward the navel or solar plexus; whereas, in the former, the radiation will be upward and outward toward the loin or else downward and inward toward the bladder. This behavior is readily explained by the nerve supply of each.

The site of maximum tenderness in ureteral lesions is most often located to the inner side of McBurney's point, where the ureter passes over the pelvic brim, and corresponds neither to appendiceal nor to tubal tenderness.

The urinary findings may be helpful or grossly misleading by reason of their negative character. If the patient is experiencing an acute attack, sufficient morphology may be, and usually is, found in the urine to guide one aright. If the condition be quiescent, the urine may be entirely negative and hence deceptive. Hunner, in a series of cases recently studied, found a normal urine in 75 %. However, he stresses the importance of the appearance of a few scattered erythrocytes or leucocytes in the catheterized specimen, as these are elements which a normal urine should not present. Therefore, one negative urine, reported routinely from the laboratory, does not justify the assumption that the urinary tract is blameless.

Likewise, the cystoscopic findings, in so far as giving definite evidence of a lesion overhead, may or may not prove helpful. If the stricture is located in the broad ligament region and is of long standing and, more particularly, if pyelitis has existed or is present at the time of examination, quite marked changes may be noted both at the ureteral orifice, and, indeed, over the whole trigonal area. The orifice, instead of being a mere slit, as normally seen, may show considerable edema, pouting and redness and the entire base of the bladder may present striking evidence of congestion. Such a picture will at once arouse suspicion of a possible lesion in the tract above.

A well-taken history; a carefully-made urinalysis of the catheterized specimen of urine; a close scrutiny of the interior of the bladder by cystoscopic examination; the exclusion of stone formation and of intestinal tract lesions by means of the roentgen-ray—these are all most helpful adjuncts, and, in combination, may afford strong presumptive evidence of the presence of a ureteral stricture. Yet the evidence thus far obtained is not absolute. To be sure, one must feel the obstruction. Any one who has passed an acorn-tipped bougie into a strictured male urethra can recall and appreciate the definite sense of resistance and hang imparted by the stricture upon removal of the bougie.

For diagnostic purposes of strictured condition of the female ureter, as well as for their treatment, the same condition is reproduced. By implanting upon the renal catheter a spindle-shaped wax bulb and by the employment of the Kelly cystoscope, one can readily determine the presence or absence of stricture. The diagnostic test rests upon the information gained by the withdrawal of the catheter thus armed. If no obstruction exists, the bulb will travel the entire course of the ureter

without pain to the patient and without hang. If obstruction does exist, both pain and the hang are imparted, the patient frequently remarking upon the similarity of the pain thus produced to her old suffering.

Within so short a compass, one can not further dwell upon the details of technic in this procedure. It is not particularly difficult, though for rapid execution it demands practice. Yet, for the conscientious surgeon, seeking more light and better results, to have definitely determined the presence or absence of ureteral stricture in any vague abdominal case, will be a most valuable aid in correctly unraveling this perplexing tangle.

INGUINAL HERNIA OF THE UTERUS*

By Hubert A. Royster, M.D.,
Raleigh, N. C.

A colored woman, Augusta M., 45 years of age, was admitted to St. Agnes Hospital on July 10, 1918, with the following rather unusual history: she had been married twice, but had never been pregnant. Her menses, occurring first in her fifteenth year, had always been vicarious, the flow proceeding from her nose regularly every twenty-eight days. Each month, following the discharge from her nose, she suffered from headache and pain in the epigastrium or in the thighs. About the age of fourteen a lump was first noticed in her left groin, but it gave her no trouble and very little attention was paid to it until two months before admission, when she began to experience pain and discomfort. According to her impression the mass had enlarged rapidly for the previous twelve months.

Examination showed a mass in her left inguinal region (Fig. 1) about the size of an average fist—hard, tender, irreducible and only slightly movable. The vagina was of normal size, but no cervix presented. On bimanual palpation the internal pelvic organs could not be found. The natural assumption was that we were dealing with a congenital protrusion of the uterus through the inguinal canal. In every other way the woman appeared healthy and well formed.

Operation was performed July 11, 1918. An incision over the mass along the groin revealed a hernial sac containing a uterus somewhat larger than normal (Fig. 2) which harbored a fibroid (Fig. 4) of the size of a billiard ball. The pedicle, which was composed of the well-developed left tube and ovary with the broad ligament, all inside the sac (Fig. 3) was tied close to its origin and the mass cut away. Closure of the inguinal canal was then made. The specimen showed complete absence of the right tube, ovary and broad ligament.

Such a case is rare, and on this account deserves recording. It is well always to be mindful of the possible contents of hernial sacs. Besides the bowel and omentum, one may encounter the appendix, the bladder, the ovary, the tube and, as in the present instance, the uterus, filling wholly or in part the sac of a hernia.

The outstanding feature of the literature on this subject is a collection of forty-five cases by Cranwell, of Buenos Aires.[1] In his paper he reports a case of his own, an Italian woman, 43 years of age, having symptoms of acute strangulated hernia on the right side. The tumor had been noticed for three years. On incision there presented a mass which at first was thought to be a twisted portion of the omentum, having a fibrous band attached and extending into the abdomen. As the mass was congested and could not be replaced, it was extirpated. It was found to consist of the uterus, very firm and rose-colored. Section showed a fibrous structure throughout and the cavity entirely obliterated. The broad ligament, tube and what seemed to be the ovary were also present, all in an edematous and hemorrhagic state.

Cranwell's review extends from 1834 presumably to 1908, the date his paper was published, and includes such instances as an autopsy on a child with multiple malformations and congenital inguinal hysterocele on the right side, containing one-half of the uterus with tube and ovary; also autopsies on two adults, aged 50, showing the uterus and adnexa in the inguinal canal; several cases of the herniated pregnant uterus, some operated upon and others delivered spontaneously; an enormous inguinal hernia reaching down to the knee and containing small intestine, omentum, cecum, ascending and transverse colon and the uterus with two cystic ovaries—operation with no difficulties and followed by good results; two operations for inguinal hernia of the uterus and adnexa in infants of two months and four months, respectively; and other types both congenital and acquired, corresponding more or less closely to the case herewith presented. A study of these forty-

*Read in Section on Surgery, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

five cases showed that many patients had been aware of the hernia for some time before the presence of the uterus or its appendages was revealed at operation and that the contents of the sac were reducible. At least thirty-two of the cases were congenital.

Three cases occurring before 1908 and apparently not included in Cranwell's report are those of Krug, Oge and Jopson. Krug's[2] patient was a girl of 18 years who had a congenital inguinal hernia of the uterus, left tube and ovary. Fifteen days after a perfectly executed operation death ensued as a result "of cardiac weakness due to degeneration of the heart muscle." He quotes English[3] as holding that hernia of the uterus with the appendages is far more rare than hernia of the ovary alone, and Pitha and Billroth[4] as stating that hernia of the uterus has been diagnosed only in pregnancy; also that in the few cases of hernia of the non-pregnant uterus the organ was irreducible.

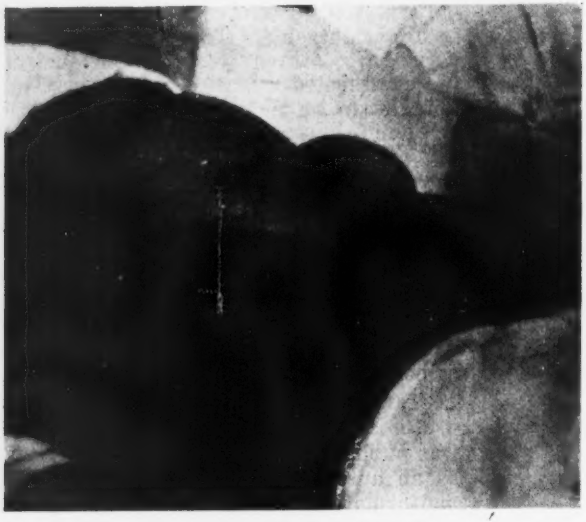


Fig. 1.—Appearance of mass in left inguinal region before operation.

Oge[5] finds in the literature twenty-five cases of hernia of the uterus, of which nineteen were in the inguinal region, two in the femoral, one in the obturator foramen and three at the umbilicus, while nearly all inguinal hysteroceles are situated on the left side. This predilection, which appears to be rather peculiar, may be explained, according to Oge, by the fact of the lesser volume of the uterus at this site and the precocity of its descent at the time when the canal of Nuck has its maximum opening. He also discusses the acquired form of hernia of the uterus in which the uterus by accident is drawn down by the adnexa into the inguinal canal and refers to the displacement of the uterus in pregnancy as described by Cruveilhier, who suggested two theories: first, that the angle of the uterus is pulled upon by the ovary with consequent hernia of the former; and second, that the enlargement of the hernial sac due to the adjacent depending peritoneum draws with it into the sac the broad ligament and the organs attached to it by a mechanism similar to that produced by hernia of the large inestine, a sort of "adhesion hernia of the uterus by gliding." The case presented by Oge was that of a woman of seventy-one years, who, seized suddenly with vomiting and colicky pains and presenting a tumor in the left groin, was admitted for strangulated hernia. The mass had existed for ten years, but had never caused her any suffering, would retract of itself and required no truss. Operation after admission revealed a loop of small intestine in the sac, the lower portion of which was occupied by the uterus with the left tube and ovary.

Jopson[6] presents the case of a colored woman, age 27, who had had a right inguinal hernia as long as she could remember—a small, painless, reducible protrusion. One week following a slight exertion she came to the hospital with a large protrusion which was diagnosed as omental hernia. At operation the sac contents were seen to be the uterus, tube and ovary of the right side, with three-quarters of an ounce of odorless pus. A supravaginal hysterectomy was performed and complete recovery took place.

A double inguinal hernia, operated upon by Parker,[7] contained on the right side

an ovary, tube, broad ligament and a small elongated uterus and on the left side only omentum.

Among the more recent articles on the subject is that of Sutton,[8] who states that hysteroceles occur at all ages, in infants, adults, old women, spinsters, as well as mothers. He notes from the records of more than fifty published cases that in nearly every instance operation was undertaken for the relief of an irreducible or strangulated hernia, when to the surprise of the surgeon a uterus, with one or both sets of its appendages, was found inside the sac. Sutton's chief interest was in the occurrence of inguinal uterine hernia in the male. In dissecting a male fetus, born at the eighth month, he found a uterus behind the bladder, communicating by means of a small vagina with the urethra in the situation of the sinus pocularis. "Each Fallopian tube passed from the uterus as a mere thread and then expanded into a fringed ampulla as it entered the inguinal canal and joined the oval body, which proved on microscopic examination to be a testis." Four additional cases from the literature, three in adults and one in a child, are reported by Sutton.

H. Upton,[9] of England, records an inguinal hernia of a rudimentary horn of the uterus and appendages in an infant of seven months with external genitals of an indeterminate type. The chief interest attached to the pseudo-hermaphrodism.

A very interesting case is that of Makkas,[10] who records a woman of 47 years with a bilateral inguinal hernia of the uterus. She came for examination on account of a swelling, the size of a goose egg, in her left groin which she had noticed for two or three years. For fourteen days the tumor could not be replaced, although previously it would disappear on lying down. Further investigation revealed a tumor in the left labium, larger than a walnut, easily pushed into the inguinal canal but returning to its former position upon release of pressure. A diagnosis of omental hernia on both sides was made. However, operation proved that each inguinal sac contained a small uterus, larger on the left, a bipartite deformity, each half protruding through the canal on its corresponding side. This is a most infrequent condition and Makkas was unable to find a single case like it. He points out in all forms of herniated uterus the striking frequency of associated malformations of the genitalia, chiefly bicornate or bipartite uterus and often atresia of the vagina. Kustner, he states, found malformation in 8 out of 11 cases. According to Makkas this frequency may indicate with great probability an etiological connection between the

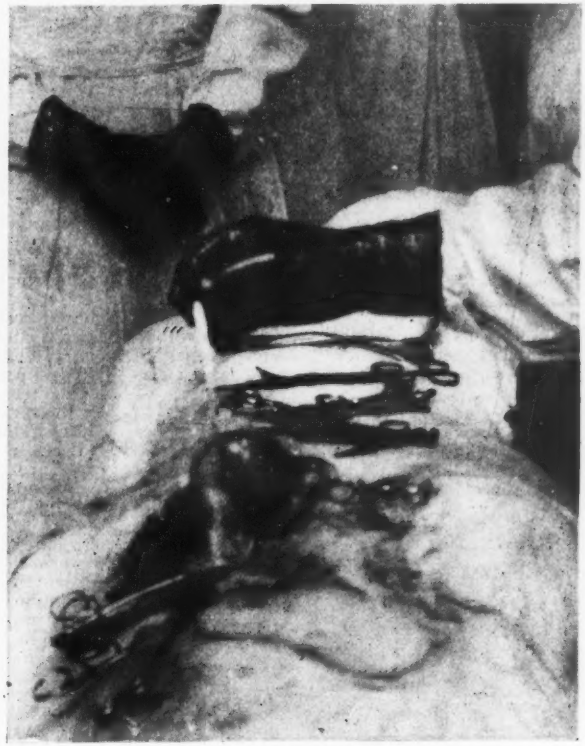


Fig. 2—Uterus with opened sac held up by tenaculum during operation.

Fig. 3.—Uterus with left ovary, tube and broad ligament after removal. Note absence of right appendages and the rudimentary cervix.

Fig. 4.—Same as Fig. 3 with uterus incised, showing the fibroid.

malformation and the occurrence of the hernia. Especially, he believes, in double uterus, the approach of the uterine halves at the internal inguinal ring will force one or both halves through the opening.

BIBLIOGRAPHY

1. Rev. de Gynecol., Paris, 1908, XII, 777.
2. Am. Jour. Obst., 1890, XXIII, p. 606.
3. Stricker's Med. Jahrbuch, H III, p. 335.
4. Handbuch. d. Chir. Bd. III., 3 Lfg. p. 66.
5. These, Paris, 1900.
6. Am. Surg., 1904, XL, 98.
7. Brit. Med. Jour., 1909, I, 947.
8. Brit. Med. Jour., 1909, II, 1265.
9. Surgery, Gynecology, and Obstetrics, 1909, IX, 480.
10. Deutsch. Zeitschr. f. chir., 1910, CVI, 401.

DISCUSSION

Dr. E. H. Richardson, Baltimore, Md.—As Dr. Royster has indicated in his very comprehensive review of the literature, this is an exceedingly rare condition. However, it is these rare conditions with which we should familiarize ourselves so that when we encounter one we will be able to recognize it. I have never seen a case, but in reviewing the literature I was particularly interested in the etiology. One suggestion is that it is due to an adhesive peritonitis. I do not place much reliance in that, but think rather that it is a part of a congenital defect. Almost invariably these hernias are associated with a congenital deficiency of some kind, as in Dr. Royster's case, where there was no tube and ovary. Frequently in these cases the uterus later slips into the sac. The congenital theory is further supported, as Dr. Royster referred to, by their relative frequency in pseudo-hermaphrodites. The literature contains numerous instances in which there were hernial sacs which contained both the male and female sex organs.

An important practical point is the relatively frequent occurrence of pregnancy in these cases of hysterocele, a serious complication, very serious indeed. When encountered one has recourse to several methods of treatment. In one instance reported, the pregnancy occurred inside the sac, terminated in an abortion, and the contractions of the uterus pulled it out of the sac. In other instances cesarian sections have been done; in others an attempt has been made to pull the large uterus back into the pelvis, but radical operation usually followed that procedure. In still other instances attempts have been made to reduce the uterus through the hernial opening in the early months of pregnancy. This is the treatment of choice.

Altogether, it is an exceedingly rare condition, but should offer no difficulty in diagnosis if one's attention is first called to the possibility of its existence, for then careful bimanual pelvic examination will reveal the true state of affairs.

Dr. Royster was fortunate to have met with such an unusual anomaly and I wish to thank him for having taught me a great deal about it that I did not know before.

Dr. F. Webb Griffith, Asheville, N. C.—Like Dr. Richardson, I also looked up some of the literature upon the subject, but Dr. Richardson has stolen my thunder and given you some of my intended remarks. It is surprising how many things can find their way into a hernial sac.

The first time I ran across a portion of the bladder in the hernial sac, I unfortunately opened it, but that is a mistake one practically never makes a second time. It will be interesting if Dr. Royster in closing will elaborate a little more fully upon the presence or absence of deformities elsewhere in the body.

Dr. John Wesley Long, Greensboro, N. C.—I think it would be difficult to diagnose such an unusual condition. I have seen only one case of the kind. This was thirty years ago and it occurred in an infant of about three and a half months, which had been delivered at seven and a half months while the mother was in the midst of typhoid fever. A month or so after birth there was noticed a little lump in the left inguinal region, which would appear and disappear. When the child was about three and a half months old the lump became fixed. In other words, it was mildly strangulated. On opening the sac I was surprised to find the uterus, tubes and ovaries. They were not adherent and were easily reduced. The incision was closed in the usual manner with prompt healing. I looked up the literature at the time and found that several similar cases had been reported.

Dr. Marcus Skinner, Selma, Ala.—Although a young man, I have seen two cases of hernia of the uterus in which the tube and ovary were strangulated. One case was in Dr. Erdman's service in New York and one was seen with Dr. Harper, of Selma. Both cases occurred in children under six months of age and both were operated upon for high labial abscess. Dr. Erdman, before operating, ventured the opinion that the condition might be one of labial abscess or it might be the tube and ovary in the inguinal canal, as he had seen the latter condition before. In both of these cases the strangulated tube and ovary were found in the canal, amputation was done at the uterine cornua and the patients recovered. I never expect to see another such case.

Dr. W. W. Harper, Selma, Ala.—The case Dr. Skinner referred to was a child four or five months of age, who was brought in as a possible labial abscess. The labia was very much swollen and the doctor who brought her in thought it might be a hernia. Under local anesthesia we operated and found a strangulated ovary, which we tied off and completed the operation for radical cure of the hernia. An hour afterward the baby was nursing and made an uneventful recovery.

Dr. Royster (closing)—About the only remarks I have to make in closing are in connection with showing the pictures, because I am afraid the photographs have not been understood. The patient I referred to had no other abnormalities. Even the vagina was as normal as could be seen, except that there was no cervix. The pedicle came across from the broad ligament and there was no well-formed os or cervix.

THE MANAGEMENT OF TUMORS OF THE URINARY BLADDER*

By Edgar G. Ballenger, M.D., F.A.C.S.,
Professor of Genito-Urinary Diseases, Medical Department, Emory University,
and
Omar F. Elder, M.D.,
Atlanta, Ga.

There are several notable landmarks in the development of the treatment of tumors of the bladder:

1. The invention of the cystoscope by Nitze and his endovesical operations with snares, forceps, etc.;

2. The discovery by Beer of the favorable influence of the high frequency current upon papillomas;

3. The use of radium applied to bladder tumors by Barringer, Kelly, Geraghty, Young and others; and

4. The development of the intensive and thorough use of the cautery through a supra-pubic incision with protective packings in the perivesical wound, as suggested by Beer, to lessen the danger of implanting new growths on the raw surfaces.

Through these developmental stages the improvement has been chiefly with papillomas, while little change for the better has resulted in the malignant tumors except the malignant papillomas, which can be influenced favorably by the high frequency current, or destroyed by the cautery, the application of radium or complete excision.

In practical work with the new growths in the bladder there are three well recognized groups, as follows: (1) benign papillomas; (2) malignant papillomas (which sometimes may look benign when viewed with the cystoscope, but which microscopically are malignant and may fail to respond to the high frequency current as do the benign growths); and (3) papillary carcimonas and sarcomas which infiltrate the bladder wall.

We shall not discuss carcinomas which extend by direct contiguity from prostatic, rectal or uterine growths.

---

*Read in Section on Urology, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

Genito-urinary surgeons almost unanimously agree that for the benign neoplasms the high frequency current is the remedy of choice. Fortunately the majority of tumors of the bladder come in this class.

There is also a fairly unanimous opinion that if the malignant papillomas fail to respond reasonably promptly to the high frequency current or to radium or both, they demand a radical operation, destruction with the actual cautery, excision, or cautery excision. Various factors determine the advisability and feasibility of the remedies, such as the age, physical condition of the patient and the location and size of the tumor or tumors. If the growth is undoubtedly malignant or infiltrating, or if it is so situated that it will require transplantation of the ureters and perhaps total cystectomy, the plan to be followed is less dogmatic and depends also upon many factors, such as the age and vitality of the patient, the probability of successful removal of all the malignant growth, and finally upon the wishes of the patient after the facts and probabilities are explained.

BENIGN PAPILLOMAS

Having thus given a brief summary of the three groups of vesical neoplasms, we shall now consider more in detail the benign growths. There is but one symptom which is present often enough to be of much value in the diagnosis, and that is hematuria. If there is no readily assignable cause for it, such as inflammatory processes, traumatism or tuberculosis of the genito-urinary tract, we think of a neoplasm, and, if the patient is in middle life, of a papilloma. The amount of blood in the urine may not be in proportion to the size of the papilloma. The most profuse hemorrhage we have seen from a bladder came from a benign papilloma not larger than a pea. The diagnosis of the neoplasm is confirmed when the growth is seen through a cystoscope. If the patient is under 35, and if the neoplasm conforms to the type we recognize as papilloma, and if the base (if seen) is apparently not infiltrated, and if there are no nodules around its attachment to the bladder wall, and if there are no ulcerations or erosions on it, and if there is not a troublesome cystitis and no incrustations, the probability is that the neoplasm we see is a benign papilloma, provided the microscopic examination of the specimen obtained is negative when sectioned and studied for malignancy, and provided there is a promptly favorable response to the high frequency current. You may say there are too many "ifs" in this last sentence, but they are all important factors and we can not disregard them, as not infrequently we have to depend upon the total clinical picture rather than any single symptom or finding.

The medical profession, as well as the public, should be emphatically impressed with the importance of blood in the urine as a symptom which demands an examination to determine its source and cause. Early cystoscopic examinations would thus occasionally save a patient's life by permitting the prompt employment of remedial measures which at a later period would be useless. This is true of renal tuberculosis as well as neoplasms of the bladder. The majority of malignant papillomas are at first benign; the malignancy and infiltration are perhaps the price of delay or inappropriate treatment.

The cystoscopic examination of a tumor of the bladder is a very simple one, but the differentiation of a benign or malignant papilloma from the papillary carcinoma may at times be difficult or impossible. To distinguish the benign from the malignant papilloma is of less importance, for the final test is the response to the high frequency current. Small single neoplasms occurring in early life are usually benign, while large multiple ones after 40 are frequently malignant. The majority of tumors of the bladder, even if benign at first, if neglected indefinitely, become malignant.

Sarcoma is prone to occur in early life 'though sometimes as late as 40 or 50 years of age; it is more round, more regular and solid looking and has, usually, a smooth appearance. The malignancy of a neoplasm may be suspected from the fixation or thickening of its pedicle or the mucosa around its attachment; also from its vascularity, edema, inelasticity and distortions, erosions, cystitis and incrustations.

The majority of malignant papillomas, if treated early, yield to the high frequency current. We do not mean, how-

ever, that time should be wasted until the period is passed when more radical measures, such as destruction with the cautery or excision, might be employed with advantage or perhaps radium given a trial.

HISTOLOGICAL EXAMINATION

The histological study of a section obtained from the growth may be either of definite value or may be entirely misleading. Naturally much depends upon the size and character of the specimen. Where a reasonably large selected specimen is obtained by the snare, rongeur forceps, or some such instrument, something of value may be determined by its proper study by a competent pathologist. If, however, we rely upon a casual histological diagnosis made from a fringe of tissue, perhaps accidentally broken off, we are more likely to be misled by its study than we would be from the cystoscopic picture and the clinical history. If possible, the specimen taken for examination should be from a part showing necrotic changes, if such are present.

RADIUM

The exact status of radium is not definitely settled, but there are certain tumors which disappear under its use, as with the high frequency, while others are not favorably influenced by it.

Geraghty has found that there is a group of neoplasms which fail to respond to the high frequency until after they are treated with radium, but admits that if a longer time had been allowed to elapse, they might have disappeared from the radium treatment alone.

Young and Barringer have found radium of value in the treatment of malignant papillomas and in the control of papillary carcinomas which for various reasons are unsuitable for cauterization partial or complete cystectomy.

RECURRENCES

As is well known, benign papillomas show a great tendency to multiple recurrences. In fact, this was the chief reason why the high frequency treatment quickly replaced the older excision method which was frequently followed by recurrences, usually multiple and extensive. With the high frequency, the prognosis is vastly better in the benign papillomas than by excision; this statement also applies to ordinary recurrences but does not apply to those which are at first very extensive or those which are multiple recurrences, — papillomatosis. For these neoplasms it is better to employ the cautery through a supra-pubic incision with protective packings in the perivesical wound, as suggested by Beer, to prevent implantations upon the raw surfaces.

MALIGNANT PAPILLOMAS

When neoplasms of the papilloma type undergo malignant changes in the villi, but the process has not extended to the bladder wall, we designate it a malignant papilloma. These growths are at times difficult to differentiate from those which have infiltrated the bladder wall and which we call papillary carcinoma. As previously stated, malignant papillomas may respond promptly to the high frequency current, but if they fail to yield, they then demand the same serious attention and radical measures that are required for papillary carcinomas.

Any papilloma which shows necrotic changes should at once be considered malignant and if the indications are that the bladder wall is not involved, it should be placed in the group which requires especial attention. It may still respond to high frequency or radium, but if it does not, it should be destroyed or excised by the cautery or removed by partial or total cystectomy before inoperable extensions have developed. We may regard as undoubtedly malignant a tumor which has become eroded and incrusted and has infiltrated the bladder wall or shows multiple nodules or bulbous edema around its base. Still further evidence is the foul-smelling urine with a persistent cystitis in a patient over 30 or 40 years of age. Whenever we find such symptoms, we may assume that the neoplasm is malignant and sufficiently long standing and extensive to require radical measures. These will depend upon many factors such as the age, vitality and temperament and inclination of the patient and upon the size, number and location of the neoplasms.

Bi-manual palpation through the rectum or the vagina in women should be done to determine if the neoplasm is palpable and to ascertain if it is secondary to a growth of the prostate gland, the seminal vesicles, rectum or uterus.

HIGH FREQUENCY TREATMENT

The high frequency current is applied to the papilloma through an insulated electrode, using an operating or catheterizing cystoscope. Beer prefers the monopolar current. In our work, the bipolar current has given results that have been just as good as the monopolar and it is more satisfactory to employ.

Where possible the current is applied near the pedicle. It is allowed to flow for about 30 seconds or until the area treated has turned white. The electrode is then placed on another place until all or part of the growth is destroyed. A cystoscopic examination is made after a week has elapsed and the treatment repeated if any of the growth remains. Subsequent examinations are made about once a month to be sure there is no recurrence and to treat it promptly if there is.

RADIUM APPLICATIONS

We have had no personal experience with the applications of radium. The technic employed varies with different operators. Barringer applies it through a cystoscope and leaves the small tube in the bladder, having the patient assume and maintain a position which will cause the radium to come near the tumor. Geraghty applies it through the cystoscope, which is held in position by means of clamps.

CAUTERY TREATMENT

The plan suggested by Beer of cauterizing the tumors of the bladder through a suprapubic incision, taking the utmost care to prevent implantations, is probably the most satisfactory technic.

The only change we make in his technic is to distend the bladder until the peritoneum is stripped well back and the vesical wall is separated from the surrounding tissue. The distending fluid is then drawn off through the catheter before the bladder is opened. Beer works without the bladder distention, using the urachus for traction.

Cauterization is greatly facilitated by the use of a good bladder speculum with a light, and a tube leading to the bottom of the bladder to draw away the smoke, urine and blood by means of a suction device such as is used in tonsil operations.

The perivesical tissues are thoroughly protected through the entire operation with alcohol sponges to prevent implantations.

Time forbids discussion of any of the above methods in detail or of going into any of the operative measures required for ureteral implantation, cystectomy, etc.

805 *Healey Bldg.*

DISCUSSION

Dr. John R. Caulk, St. Louis, Mo.—As urologists I think our chief mission is to impress the practitioners with the fact that in these bladder tumors the average duration of symptoms has been ten years. I think that is a pretty serious problem, due to the fact that the initial symptoms are so insidious. They fool the patient and the doctor. That we must teach the general practitioner. In handling the tumors of the bladder, many of the malignant and all of the benign can be treated with the high frequency current. If you have an alternating current you seldom have any trouble, but if you have to transform the current there is apt to be short circuiting and back firing. If you isolate the table on good heavy glass casters they will obviate the difficulty. The great difficulty is in the treatment of the infiltrated papilloma and epithelioma of the bladder. My results in the treatment of bladder cancer have been very poor, because of the fact that the patients came so late. They have usually been present for ten to fifteen years and have involved the whole neck of the bladder before the patients present themselves. In a whole series of seventy-five or eighty cases there have been only six that were definitely dissectable. The others have been treated palliatively by cauterization. I have never done a complete cystectomy and have never felt that it was justifiable. We have been freeing the bladder so that we could watch our manipulations, and I feel that it is very important to have the bladder completely free throughout before attempting resection. I often put in a ureteral catheter on the side corresponding to the tumor to protect the ureter. After dissecting the tumor in this way we have placed the catheters in the ureters and kept the bladder nice and dry, and we get a dry union and prompt healing. In six cases we have had very good results; three are three years, two are two years old, and one is about a year old. About a month ago one patient came back with a small recurrence in the site of the scar and two high frequency treatments healed it up.

I think the main thing we have to do is to let the profession know the seriousness of the insidious symptoms and the hematuria.

Dr. G. Timberlake, Baltimore, Md.—We seldom take seriously enough subjectively symptomless hematurias. This condition as a symptom is none other than a call for investigation, apprehension of source and cause. There are so many points betwixt the meatus urinarius and the upper kidney poles which require careful inspection that we should take into account the minutest details.

While the clinical picture and character of blood, along with its disposition from the bladder, lead to possible diagnosis, without doubt, for complete diagnosis, location, distribution, character of tumor and choice of treatment, we are dependent upon the cystoscope. Of the cystoscopes commonly used, we have three prominent types—the direct, corrected and uncorrected indirect instruments. From this, it is obvious that the exclusive use of a direct against an indirect may make for incomplete diagnosis. This is well exemplified in an experience that I had a few years ago, wherein I employed an indirect instrument and true, found a tumor lying well to the right of the trigone. The character of the mass and its contour led me to believe it malignant. This was confirmed by my having taken a piece with a cystoscopic rongeur for sections. From its apparent isolation it was deemed wise to do a cystotomy, burn down and resect with cautery knife. This plan followed, we encountered a very much larger growth in the dome of the bladder which was well without the line of vision of the indirect instrument. Had I used the direct instrument, the chances for having missed the first and smaller tumor would have been very great. Due to the fact that this latter tumor was so large and flat, we thought resection unwise. At any rate, much of both was burned down by the electric cautery. Later, cystectomy was thought of, recommended, accepted and accomplished. This was done and the ureters drawn out and anchored lateral to the recti muscles. In a few days the ureters broke their moorings and returned to the bladder lair. They were located, novocaine employed for anesthesia and ureters returned and more securely anchored. This having been done, No. 15 French catheters were inserted and drainage established. The recovery was slow and tedious, but to this date the patient has lived for over three and a half years, the most of which time he has been conducting his business satisfactorily to himself and others.

I am by no means sure that this is the point of election for ureteral transplantation, but if all patients do as well where the ureters are placed elsewhere, after explanation, the patients might have their choice of electing their points of drainage.

Dr. Bransford Lewis, St. Louis, Mo.—In the last ten or fifteen years in talking to students about hematuria I have insisted that the proper object of the doctor in the presence of hematuria was not to cure the hematuria; that he should at first have one object in view, which was to find out the source and cause of the bleeding.

With regard to tumors of the bladder, when we have decided that they are tumors—I think we can not make the diagnosis by the symptomatology, but by correct diagnosis with the cystoscope—the first thing is to decide the character of the tumor, as already pointed out by Dr. Ballenger in his excellent paper. The next point is in regard to the curability, even if malignant. I am convinced that carcinomas should be subjected to the more efficient treatments that have been brought out in the last few years. I have four cases in mind that were inoperable that gave very interesting results. One patient was a woman who had such an enormous tumor that one had no space for working with the cystoscope, and one could only see a large cauliflower growth of carcinoma. She was taking a grain and a half of morphin a day to allay her suffering, and from every standpoint the case was very unpromising. Instead of relying upon one method of treatment, I used radium, the deep intensive x-rays, and fulguration through the cystoscope. Within ten months, instead of being in the exceedingly bad condition which was present at the beginning, she was greatly improved. She is now away on an automobile trip; the tumor has disappeared except for an ulcerating area, and she has so far progressed that she and her husband and every one is delighted. She has gained at least thirty pounds and is feeling well. In two other cases the tumors have entirely disappeared and the bladder walls are free. In the fourth case the only evidence of trouble is hematuria from the right kidney, but the bladder is free. There are four cases of definite malignancy that have been cleared up or vastly improved, so we have that much encouragement to report from the use of these methods.

Good effects are obtained provided the general profession brings the patient to us for the treatments before it is too late.

With reference to the little detail of technic, the short circuit, I believe Dr. Caulk had a very serious time once with a short circuit. I have a rheostat that is wound with one coil inside the other, providing an induction current so one can not get a direct connection through it. Since using that, I have had no short circuit.

Dr. A. J. Crowell, Charlotte, N. C.—I am not on my feet to discuss this paper, but to ask our Chairman to discuss it and tell us about the use of radium in such cases. I think it a very important subject and radium a very important factor in the treatment of these conditions. I have seen some very excellent results obtained from its use in benign as well as malignant tumors of the bladder. I have just visited one of the great clinics in this country and find they are operating first and then use radium. I think Drs. Geraghty and Young apply radium before operation.

Dr. John T. Geraghty, Baltimore, Md.—Our experience with radium now dates over a period of four and a half years. We find that all benign, all malignant and possibly all of the recurrent papillomas will disappear under radium. We have found that in the cases where the tumor infiltrates the bladder our results so far have been negative. We have not yet cured any infiltrating tumor of the bladder. If the tumor is an infiltrating carcinoma it is our custom, if it is operable, to do a resection and not waste time in using radium on that tumor.

Tumors which are not infiltrating should not be operated upon, but treated with radium or radium in combination with fulguration, and the results from this treatment are much superior to our operative results obtained in the past.

Dr. Ballenger (closing).—There is nothing I wish to add, except to thank those who have discussed the paper.

EYE, EAR, NOSE AND THROAT

AN ORBITO-PALATAL ROUTE OF TRANSILLUMINATING THE MAXILLARY SINUS*

By H. H. Briggs, M.D.,
Asheville, N. C.

In these days, when so much stress is rightly laid upon diagnosis and etiology, and when so many diseases which have heretofore been considered entities are now found to be manifestations of various kinds of infections, and when there has been such a relentless search for foci of infection of distant organs such as the heart, kidneys and joints, it behooves us, as rhinologists, to equip ourselves efficiently with accurate knowledge of the anatomy of the upper respiratory tract and the nasal accessory sinuses, and of the pathologic conditions which are not only in themselves a menace and danger, but are often the cause of far-reaching infections whose syndrome is familiar to all. Of all the accessory sinuses, the maxillary, once infected, becomes probably the most potent. Its mucous membrane walls afford a large area for absorption of toxins, especially when its fluid contents are under pressure.

When so keen an observer as Reschreiter, in his exhaustive research, found the maxillary sinus absent but four times, we may safely say it is the most constant of all the nasal accessory sinuses. Its regularity in size is attested by the data given by Davis[1] in a most valuable contribution to anatomy, and from which the following mensuration is quoted:

At 85 days, the embryo shows an outpouching of the mucosa near the wall of the infundibulum ethmoidale, which, in six or seven months, becomes an oblong sinus. At first the vertical and lateral diameters are encroached upon by the developing teeth to the extent that at the age of eight days (in 101 cases) the diameters were: anteroposterior 8.2 mm., lateral 2.8 mm., vertical 3.3 mm. Up to the eighth year the diameters increase per year at the rate of 2 mm. each for the vertical and 3 mm. for the anteroposterior. Thereafter development advances more slowly in all directions until the fifteenth to eighteenth year, the average adult size of 26.5 mm. vertically, 20 mm. horizontally, and 32 mm. anteroposteriorly is approximated. Later changes show more in the posterior-inferior angle, which descends as the third molar erupts. The floor, at first above the nasal floor, descends to its level during the eighth year and continues to descend thereafter until adolescence, and in the great majority of adults, regardless of sex, it is from 1 to 7.5 mm. below the nasal floor.

The shape of the antrum in early childhood is ovoid, in later childhood pyramidal, persisting as the adult type — the base being the nasal wall and the apex the processus zygomaticus, quadrilateral at the base, and becoming triangular as the apex is reached. The rounded anterior and posterior walls are more closely approximated inferiorly than superiorly, and as the apex is approached, the rounded inferior angles are so close together that the resulting single round angle becomes the inferior boundary in the apical portion. The shape of the anterior wall is often modified by a deep canine fossa. The superior or orbital wall is a thin plate of bone measuring from 0.5 to 1.5 mm., the posterior wall from 0.5 to 3 mm. and the facial wall, the thickest and strongest of the three, from 2 to 5 mm. The floor, in all stages of its development, is in close relation to the teeth, there being always a bony covering over their roots. The typical floor is over the molars and the posterior portion of the second premolar. The canine tooth is never found under the antrum, yet its posterior border may be immediately in front of it. From examination of 101 cases, Davis found the following millimeter measurements to represent the average diameters:

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

1. Annals of Rhinology, Otology and Laryngology, September, 1918.

	Vertical	Lateral	Anteroposterior	
Under 1 year	5.7	4.6	13.3	4.3 above floor
10 years	21.0	18.0	37.5	0.2 above floor
20 years	26.5	20.0	32.0	1 to 7.5 below floor

Transillumination is in most cases our most reliable means of diagnosing acute and chronic infection of the maxillary sinus—perhaps more reliable and trustworthy even than the x-ray. Anything, therefore, that in the least adds to our knowledge of transillumination—the nature of the light, its shape, variation of its intensity, or method of application, should be welcomed by all, and to this end the author offers a description of a method he has used with most gratifying results for ten years, namely: an orbito-palatal route of transillumination.

For many years it has been known that light passed from the roof of the mouth will enter the orbit and eye-ball, often illuminating its interior. No new discovery as to principle is to be offered, but one of application only.

The light should be from a small filament of ample intensity and controlled by a reostat in order to bring out slight variations of translucency for comparison with that of the normal and with that of the fellow antrum. All possible escape of light against the patient's face, or into the room should be prevented and the room made jet black. The patient placed on a high stool is requested to tilt the head backward, gently close the eyes and to open the mouth so as to make a view of the hard palate possible. The light is placed a few millimeters below the margin of the lower lid and pushed inward and pointed downward until the infraorbital ridge is well passed, when, with the cheek retracted, an area of pink will be seen on that portion of the roof of the mouth and outer antral wall surrounding the molars, corresponding with the floor of the antrum.

The value of transillumination depends on the obstruction which the contents of the antrum and its mucous membrane offer to transmitted light. Uncontaminated mucus alone offers a degree of resistance and normal mucous membrane offers even more. As the contained mucus becomes infected and contaminated, and the mucous membrane becomes swollen, hyperemic and indurated, the light becomes less penetrating, and when the sinus is filled with pus and detritus, especially in chronic cases, and the mucous membrane becomes highly thickened by the pathological process, including polyps, a high degree of illumination becomes necessary to any degree of translucency. It is, therefore, necessary in order to perceive the slight degrees of variation that the light be directed through the least possible amount of bone and soft structures to be found outside the mucous membrane.

We are to differentiate between the normal and abnormal condition of the sinuses by the greater obstruction which the abnormal contents, its thickened mucous membrane and possibly its thickened, bony inner surface offer over that of the normal sinus. Any extraneous bone or soft tissue which also offers resistance to light interferes, therefore, with the test, and since the orbital bony wall is one-third as thick as that of the facial wall and their overlying soft tissues which the light must traverse is in the same ratio, it seems probable, therefore, that the facial offers three times more resistance to light than does the orbital wall. Moreover, in the orbito-palatal route the light passes more nearly through the center of the antrum, through opposite instead of adjacent walls, and, therefore, through a greater extent of abnormal structures. Lastly, although not least, there seems to me an advantage in allowing the exit of light to be through the wall containing, or adjacent to, the pathological condition, for a somewhat similar reason that the roentgenologist places next to the plate the surface nearest to which the foreign body to be shown lies. This idea occurred to me on noticing how plainly the subcutaneous veins over the frontal sinus may be demonstrated by transillumination. The floor of the antrum, because of its pendent position and of its proximity to the alveolar process, which so frequently contains the source of antral infection, is unquestionably, in the great

majority of cases, the wall offering the greatest pathological changes, and, therefore, the greatest obstruction to transillumination.

DISCUSSION

Dr. R. C. Lynch, New Orleans, La.—I had the privilege of witnessing the demonstration of this transillumination Dr. Briggs offered in his own dark room Monday and it showed up brilliantly. I must confess to you that I had never used the method before until a week before I came here, and I received Dr. Briggs' communication for the subject of his paper and tried it for that week at home in my own dark room, and I did not see enough antrum to get any definite relative value of the two methods—that is, placing a light of similar intensity in the mouth and looking for the transillumination on the intra-orbital wall, paying no attention whatever to that transillumination, or shadow, or translucency that appears on the cheek surface. I am sure that the method would have one great advantage over the mouth route in that it saves putting the light in the mouth, which means that we save that possibility of contamination of the instrument from patient to patient. I am just imagining the proposition. I was wondering whether it might show up the possibility of dentigerous cysts or tumors of that kind that might be missed by the mouth route in that this transillumination gives a translucence also to the buccal gingival. This light comes from the antrum wall into the buccal gingival mucous membrane, and if there were dentigerous cysts there containing no fluid it might be possible to determine the presence of their situation, which might be overlooked when the light was put in the mouth cavity. There is no doubt that the transillumination through the mouth has given us a most valuable means of diagnosis of antrum conditions, both acute and chronic, and the method that surely is employed by all of us. I have not had sufficient experience to compare the two types. I wonder if Dr. Briggs has any information relative to ethmoids and whether he gained any more information than by nasal examination in ethmoids? So far, as I say, I have not used it sufficiently to make a discussion of any particular value. I have tried it and it shows up very prettily exactly what Dr. Briggs says, and has the particular advantage of not putting the instrument in the patient's mouth, which I believe will appeal both to us and the patients.

Dr. J. A. Stucky, Lexington, Ky.—There are two or three points in Dr. Briggs' paper that I desire to emphasize. I think the method he brought to our attention is a decided advance and, added to the stereopticon radiogram, it makes our ability to diagnose maxillary antrum condition more certain than any one other thing. He said in the beginning of his paper that an accurate knowledge of the anatomical parts was necessary. Unfortunately this is a difficult matter. I question whether there can be such a thing as an accurate knowledge of the anatomical nasal accessory sinuses. Crile, of Philadelphia, can disprove almost any statements made in text books, if you will look at the numerous specimens he has. There are so many variations, so many misleading things, bony, etc., in them. For that reason I have come to the conclusion that a stereoscopic radiogram is necessary. I see so many sinuses that it is a part of my routine examination to have radiograms made. One other thing that Dr. Briggs mentioned is that the absorption in the infected sinus is from pressure. If that fluid, or pus, is under pressure, then you have two things: pain and absorption, and there is a difference between pain from negative pressure and pain from positive pressure. If the pain is due to negative pressure and the sinus is blocked by the turbinates, then we are not justified in opening the sinus, and we are often astonished at the clear transillumination, and yet the patient has intense antrum pain. Another point mentioned is the misleading effect of the transillumination in the sinus that has a thickened wall or the lining. So often we have cases with very little evidence of retained pus or secretion; this is due to the fact that there is some ventilation going on all the time. Our surgery differs from all other surgery, in that we must have drainage and ventilation. It is often necessary to vary the intensity of the light. I have seen some transillumination so bright that you could look through a thick, bony wall. These are misleading. I think the method advocated is a decided advance and with the stereoscopic radiogram we can very nearly see what exists.

Dr. W. L. Simpson, Memphis, Tenn.—I have made very little use of this transilluminator, but from what I have seen it seems to me it has some advantages over the ordinary way of lighting in the mouth. One point made in the paper was that transillumination is the most valuable means of diagnosis. I think we should mention the washing of the antrums above all other methods of diagnosis in thickened walls; in chronic cases, running a good while, you may get a positive shadow with the transilluminator and have practically or entirely a normal antrum. That is often seen and there is only one way to make a diagnosis in that case: to wash it out. The x-ray will show definitely that case. The x-ray will give you very definite information that no transilluminator will give; for instance, an unerupted tooth and dentigerous cysts. Washing out the antrum and transillumination will not give the information that the stereographic pictures, or in fact any x-ray, will give.

Dr. R. H. Cowley, Berea, Ky.—I happen to know of a case which Dr. Briggs had last summer which illustrates the value of a portable instrument such as this. There were no suggestive symptoms in the case which was seen at her home in the country. As a matter of routine the instrument was brought along and used and a dark antrum was found which was later operated upon and found to be full of pus.

There is no good reason why an instrument of this kind which can be carried in the pocket should not be a part of the equipment of every general practitioner. I believe that in our mountain regions there are an enormous number of sinus cases and the general practitioner

should be encouraged to try to recognize and make at least a tentative diagnosis of them.

Dr. E. H. Cary, Dallas, Tex.—There is no reason why the general practitioner can not use the method, but interpretation of what he may see is the difficult problem.

Dr. G. M. Maxwell, Roanoke, Va.—

"The friends thou hast, and their adoption tried,
Grapple them to thy soul with hoops of steel;
But do not dull thy palm with entertainment of
each new-hatched, unfledged comrade."

I like to see a new instrument brought out and I think Dr. Briggs has brought up something new for us to think about. There is an objection to that transilluminator and I think it will help Dr. Briggs if I bring it out. We lose with this instrument a valuable point in diagnosing antrum—that is, the contrast picture. With the transilluminator in the mouth we see both antrums transilluminated at the same time. We can see at a glance if one side is darker than the other. The trouble here is when I use it in the right eye by the time I get it in the left eye I forget how much shadow there was in the right antrum. That can be overcome by having two stems made for the instrument and putting one in each eye with a switch arranged to shift the light from one to the other.

Dr. J. Brown Farrior, Tampa, Fla.—This method is the only method of transillumination that I have used for nearly five years, and I have used it through the wall. I am glad this question has come up, because I have been asked by one or two gentlemen who have referred cases to me what I did with transillumination. I have abandoned the child. I want to be put right. I have abandoned it because I have learned to depend upon the clinical aspect and upon the x-ray for my diagnosis. Though it may be an aid, I have not been able to determine in any instance whether the antrum required operative help or not by transillumination. Also, I have the clinical aspect; if the antrum contains pus I have always been able to determine the pus within the nasal passages. I take the x-ray purely for the extent of involvement because I believe no man can determine by clinical aspect and by palpation the involvement of the antrum I discarded transillumination as I said, because I found it was not valuable as an aid to diagnosis. I want to ask Dr. Briggs how much he depends upon this point for operative help.

Dr. Eldred B. Cayce, Nashville, Tenn.—There has been some discussion about the possibility of having an instrument at hand. Dr. Andrews, of Chicago, carried a fountain pen which had a transilluminator, a rheostat in it, and he says he can transilluminate any of his cases by this method that Dr. Briggs has described, and which he recommends.

Dr. E. G. Gill, Roanoke, Va.—I think the best method possible for determining the condition of the antrum is to irrigate it. I feel in regard to the x-ray that the only help it gives us is in determining whether there is infection at the root of the teeth. I do not think any one is justified in treating an infected antrum until he has had an x-ray picture made of the corresponding teeth, as in many cases there is a primary source of infection.

Dr. Briggs (closing).—As a part of the routine examination of every nose or throat case coming under my care, the sinuses are transilluminated and the findings recorded. If there is suspicious interference to the light's passage, and if nasal inspection or the history of the case suggests sinus involvement, the sinuses are x-rayed. If there is still a question of infection, for diagnostic purpose a trocar is passed from the inferior fossa through one nasal wall (never through the natural opening) and the sinus irrigated. Irrigating the antrum through the natural opening as a diagnostic or therapeutic means is unsurgical, ineffective, and oftimes causes infection to a normal antrum.

For five years I compared the author's method of transillumination with the old method, and even now I sometimes use both methods. For me the orbito-palatal route gives more uniform results, is more reliable in the great majority of cases, is more quickly used, and is more cleanly. The light bulb requires only the ordinary cleanliness, as it does not touch a mucous surface, but the skin surface only. To be put in the mouth the lamp should require the same sterilization as does a tongue depressor or laryngeal mirror, viz., heat sterilization rather than the insufficient so-called antiseptic sterilization.

By using two lights of equal intensity, one in each orbit, a careful comparison of the translucency of the two antra can be made, and probably better than can be made with the one light alternating from side to side.

I have used this method of transillumination for ten years and have become more enthusiastic in its favor from year to year. I hope some time to have something to say in regard to transilluminating the ethmoid cells.

THE MAXILLARY SINUS IN THE ROLE OF A RESERVOIR FOR OVERLYING SINUS DISEASE*

By Homer Dupuy, A.M., M.D.,
New Orleans, La.

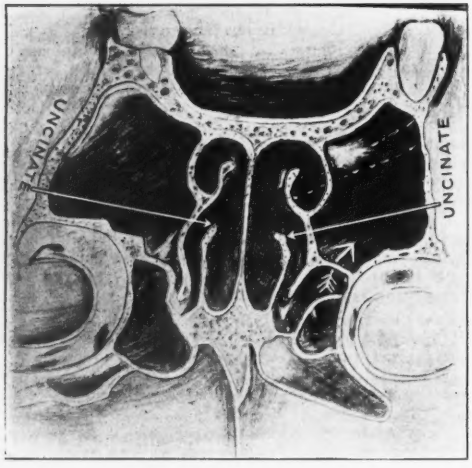
My review of the literature, and some of my own discouraging experiences, convince me that many things still remain unsaid relative to that type of maxillary sinus trouble which is only a sequence in the development of certain pathologic events. It is one of the causes of failure to cure a supposedly primary maxillary affection despite the adoption of radical operative measures.

ANATOMICAL

Why should the flow of purulent secretions from the fronto-ethmoidal region, in certain subjects, be directed toward the

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

maxillary sinus? It is largely due to anatomic variations in the architecture of the middle meatus. There is infinite variety in the relations of the structures composing this region. Uniformity as to size and direction of these component parts does not exist even in the same individual on opposite sides. This structural variation is expressed in many ways. Cadaveric specimens give such examples as the following: close proximity of the anterior ethmoid openings to the maxillary sinus ostium. There may be accessory ostia leading to the antrum. These are potential inlets for purulent material from above. Moreover, these accessory



Illustrating a long and broad uncinate process. The arrow shows the direction fluids would be more apt to take when coming from the upper sinuses.

ostia are usually of large diameter. The anterior and the posterior ethmoid cells may communicate directly with the antrum. An unusually large, but normal, middle turbinate can inpinge on the hiatus semilunaris and thus retard drainage from this recess. The most important variation is that relating to the uncinate process. As it forms the inner boundary of the hiatus, changes in its configuration may favor the passage of secretions into the maxillary sinus. When the uncinate is broad, oblique and long, it forms a deep groove with the lateral nasal wall. At the end of this trough-like recess lies the maxillary opening which is thus placed in the best possible position to receive fluids gravitating from overlying cavities. The way of least resistance will be toward the antral opening. While we can not place the whole blame on the uncinate, it must be considered as one of the most important factors in converting the maxillary into a reservoir for accumulations of pus from above.

CLINICAL

The symptom-complex does not give clear signals that the maxillary sinus affection is the result of secretions flowing from another sinus. There is an absence of definite, localized pain. The existence of a fetid discharge from the nose, with the feeling of fullness over the cheek on one side, the accepted belief that the maxillary sinus is the one most frequently involved, naturally leads us first to suspect it. In some instances we are still more easily misled, and these are the cases, not so rare in my experience, in which the roots of the teeth lie beneath the mucoperiosteal lining of the antrum. Under such conditions should pus remain for a protracted period in contact with these projecting roots, it is not only possible, but it actually occurs, that one or more of the bicuspids, or molar roots, become infected. We have here clinical features suggesting a dental origin. It will then require fine differentiation to trace the primary source of trouble. We must, therefore, in the light of a larger experience and more critical investigations first reverse our former contention relative to the teeth and maxillary disease as cause and effect. We must now accept the statement that more frequently than many of us suspect the tooth infection is an end-result of a pus collection in the maxillary. The absence of pain in the fronto-ethmoid region; the evidence of pus in the maxillary after puncturing the naso-antral wall; an x-ray substantiation that a diseased root projects into the antrum — all these are data which will influence us, unless we are very circumspect, in drawing the conclusion that we are treating a maxillary sinus condition initiated by dental structures. Acting on this belief, the diseased tooth is removed. Intra-nasal irrigations are practiced by multiple punctures of the naso-antral wall. Despite

these measures large quantities of pus still continue to accumulate in the nose at each antral irrigation. We are naturally driven to the radical operative procedures. On opening, say through the canine fossa, we may find polypoid degeneration of the mucous lining of the antrum. In another group of cases we may find, on the closest inspection, that this cavity contains not the slightest trace of degenerated tissue. Only pus is present. The operation is completed in every detail. Our patient returns in a few months with the chastening evidence that the purulent secretions, while less fetid and less annoying, like the merry brook, still "flow on forever."

Some of us must certainly admit that this is neither a fanciful nor an exaggerated picture.

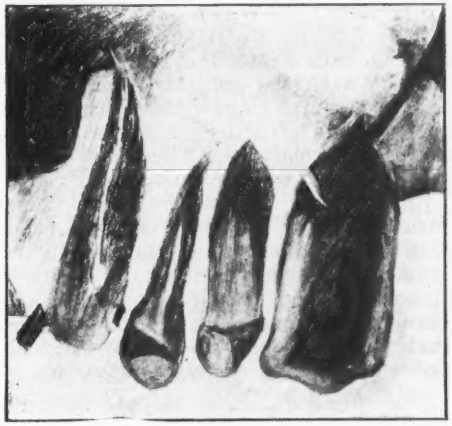
GENERAL CONSIDERATIONS

We must now emphasize two underlying conditions, either one of which is present in this type of maxillary sinus affection. In one the maxillary acts only as a reservoir, the muco-periosteal lining membrane of the cavity being absolutely unaffected. This freedom from tissue changes would in itself point to the reservoir character of the sinus trouble.

The other condition is that in which a maxillary acts as a mere receptacle for pus with, however, ultimate morbid alterations of its lining mucosa. It seems impossible to state just what influences predispose to this final change in some cases only. One thing, however, is certain, that when the roots of teeth project along the antral floor, and are covered only by the mucous lining of the sinus, just as soon as one or more of these roots become infected, which seems inevitable, we have a starting point for complete invasion of the cavity. Then follow those polypoid alterations. Every circumstance here invites us to draw the inference that we are in the presence of a maxillary affection of purely dental origin.

A short digression will not be amiss. Let us note that the concensus of opinion with regard to the dental causation of maxillary sinus infection makes it between 20 and 30 % of the total number. The reservoir type of maxillary trouble *with the teeth involvement as a sequence instead of a cause* will still further reduce the percentage of the part played by teeth as a primary cause of antrum disease.

Let us now briefly review some of the measures and diagnostic refinements which, when applied, will help reduce our failures to recognize those maxillary troubles caused by disease of the overlying accessory nasal cavities. In the class of cases we are considering, the maxillary, for reasons already advanced, is nearly always the sinus we suspect. Transillumination can at best give us only presumptive evidence. The x-ray applied to the diagnosis of sinus disease is, in my experience, becoming more trustworthy. For our present purpose, that of unraveling such a problem as we are considering, skiagraphy gives us positive knowledge as to the relation of the teeth to the floor



Picture from an x-ray showing projecting roots in antrum. Long-standing collection of pus would probably make the tooth infection a sequence and not a cause.

of the antrum, and whether or not a particular tooth, which projects into the sinus, is diseased.

When applied to the fronto-ethmoid cavities, we can rely on a unilateral shadow as indicating morbid changes. Of course there must be a comparison of the two sides. A perfected technic, proper photographic positions and interpretation by one of large and special experience in this line, are very essential if we are to place any reliance on this diagnostic means as a help to us in reaching a conclusion as to which sinus, or group of sinuses, may

be responsible for having initiated the trouble. With certainty, however, the x-ray will tell us whether the sinus is divided by septa with the formation of an accessory cavity. This skiagraphic information will further secure the almost unfailing needle punctures through the nasal side. The puncture after all gives positive knowledge. When it is thus established that pus is present, the all-essential question is, to prove whether it is a product of inflammation within the maxillary, or whether it is the outcome of a flow into the antrum from the parts above it. To determine this we must re-examine our patient, say, after the expiration of two hours. If pus reappears in the middle meatus in so short a time it is now definitely settled that it must come from one of the higher sinuses, frontal or anterior ethmoid. Which one? Differentiation is now hardly required, for all anatomical data prove the intimate connection between the anterior ethmoid cells and the frontal sinus. By continuity and contiguity of structure these two sinuses are usually coaffected. Therefore, whether we wash out the fronto-ethmoid cavities with a canula or use the suction apparatus; whether we apply lavage and suction after resection of the middle turbinate, it can only amount to corroboration of the evidence already unmistakably furnished by the needle punctures, namely, that pus in the antrum at first originated from the sinuses situated higher up.

The final question is to determine whether the reservoir type of maxillary is itself the seat of actual disease and not simply a receptacle for the accumulation of pus. This can be readily ascertained by irrigating the maxillary several times at intervals of forty-eight hours. When pus reappears at each irrigation there is only one meaning possible, we have a genuine sinus infection. To insure this method the diagnostic value it really possesses, proper drainage from the fronto-ethmoid region must have been previously established. To this end, a middle turbinectomy is practiced, all bony projections in the hiatus, especially those formed by the uncinate process and bulla ethmoidals, are pared off, any existing polypoid masses are resected; in fact, the removal of any and all structural hindrances. All this is done with the object of making the line of least resistance for fluids moving along the hiatus *away from and not toward the maxillary sinus ostium*. When we have re-established drainage from the fronto-ethmoid region along the more usual route in the hiatus, the repeated irrigations of the maxillary will not fail us in their diagnostic value.

CONCLUSION

I consider every chronic maxillary sinus affection as of the reservoir type until the reverse is proven.

Discussion follows paper by Dr. J. W. Jervey, page 293.

THE MAXILLARY SINUS*

By John T. Crebbin, M.D.,
New Orleans, La.

The maxillary sinus is situated in the body of the superior maxillary bone. Owing to its accessibility, this sinus was considered more frequently affected than the others, but as we have investigated further, we find this is not so.

This sinus exists at birth, but only reaches its full development at puberty, the walls varying in thickness. The roots of the first and second molar teeth sometimes protrude into the antrum. The infection may extend through these teeth, and it is estimated that at least one-half of all empyema of the antrum has its origin in diseased teeth, while the remainder is due chiefly to intranasal diseases and anatomical deformities of the nose.

The ostium maxillare, situated beneath the middle turbinal bone, is the natural opening. The cavity depends for drainage upon the cilia of the epithelial lining. This is an extremely delicate mucosa, and is a continuation of the nasal mucosal lining, being composed of an epithelial, a glandula and a periosteal layer. Occasionally, a vertical septum divides the antrum into a posterior and anterior cavity. Horizontal septa have been found less frequently.

The maxillary sinus is subject to acute

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

and chronic inflammatory changes, cysts, benign and malignant tumors. The chief symptom is pain and discharge of pus from the nose. Pain is especially true of an acute attack, being more severe about the eminence of the malar bone and in the infraorbital region. Diagnosis is made by the location of pain and intermittence in the flow of pus. Transillumination and the skiagraph are also valuable agencies in helping to make a diagnosis.

Many an acute attack can be cured by making an application of cocaine 2 to 4 % and adrenalin to the ostium maxillare for a few minutes, followed by an application of lunargen 40 %, or by irrigating through the natural, or an artificially made opening, under the inferior turbinate bone. Naturally in chronic cases, this line of treatment will relieve, but certainly will not cure. After a reasonable length of this treatment, one is justified in resorting to surgical intervention.

Cowper, in 1707, was the first to introduce the method of draining the antrum through an opening made in the alveolus, and for two hundred years this method was followed until Mikulicz made an opening through the nasal wall. His method was in vogue until quite recently, when Caldwell, Luc and others modified and improved on his investigations. Under no circumstances should a tooth be removed with the object of drainage and irrigation through this opening unless the tooth is diseased. Such procedure can not be too strongly condemned. The simplest operation is the removal of a section of the anterior-inferior portion of the naso-antral wall. However, this operation has but a small sphere in the surgery of the antrum.

The Caldwell-Luc have their advocates, but it is generally accepted that the Denker operation is superior to all others. This should be done under a local anesthetic, either the usual method of novocaine, ½ of 1 %, and adrenalin injections, or by the nerve blocking method. A general anesthetic is seldom, if ever, indicated.

Although advised by Denker and the majority of operators, the anterior end of the inferior turbinate bone should never be removed. The incision is the same as in the Caldwell-Luc operation, except that it is extended to the median line. After the antrum is thoroughly curetted, instead of entering the nasal cavity posteriorly to the bridge and cutting forward, as advised by some operators, the logical procedure is to extend the bony opening toward the median line and remove the bridge of bone between the opertura pyriformis, thus including the inferior-external angle. The bony wall between the antrum and nasal cavity is then removed, extending the opening posteriorly to the desired depth, and superiorly, to the attachment of the inferior turbinate bone.

After this has been accomplished a narrow layer of gauze, three or four inches in length, is saturated with compound tincture of benzoine and introduced into the antrum through the nasal opening. The incision is then sutured. The next day the gauze is removed and no irrigation or after-treatment is necessary, as a rule. In the event there is edema of the parts, cold applications will help to reduce it.

This operation, following the suggestion of not removing the anterior end of the middle turbinate bone, is superior to the others. It is done more quickly and the nasal opening is permanent, which gives free drainage and ventilation to the antrum.

1207 *Maison Blanche.*

Discussion follows paper by Dr. J. W. Jervey, page 293.

X-RAY AID IN THE DIAGNOSIS OF NASAL ACCESSORY SINUS DISEASE*

By J. W. Jervey, M.D.,
Greenville, S. C.

He that seeketh and knoweth not that which he seeketh is a fool, and disappointment shall be his portion even unto the end of his days. But he that seeketh and knoweth that which he seeketh is a wise man and it shall be found unto him, even though it be happiness, the most elusive of all psychic abstractions. For if a man seeketh happiness and knoweth happiness, surely he hath happiness.

For all I know that may be an old Arab-

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

ian proverb, or something akin. I have often observed that when one gets off a thing like that it is not long before it is in some brutal and coarse fashion brought to his attention that some proverbial-minded old wiseacre of a Brahman seer, or a Confucian of celestial vision, or perhaps some old intellectual giant of a Roman senator has said the same thing two or three thousand years ago, and no doubt said it a whole lot better. But at this present minute I have said it last, and they can not take that away from me. It only shows that the intellect of the world, like its history, indeed like itself, revolves in cycles; while the old bird Pythagoras may yet have been right and metempsychosis prove the salvation of the individual soul.

But what I started out to do was to invite your attention to an old fact of which you have long been aware, namely, that if one looks long enough and hard enough and enthusiastically and single-mindedly enough, one is likely to find whatever may be one's heart's desire. This is particularly true, if I may venture to say so in this austerely particular company, of specialists in general; and more especially is it true of laboratory workers in particular.

Doubtless my experience and experiences with the industrious laborers in the laboratory vineyards have been commonly shared with many of you. Twenty years ago I asked little and expected little from these earnest workers of the laboratory. Six or eight years ago I had reached the point where I asked much and expected much. Today I ask much and still expect much—but with reservations and interpretations of my own—and even sometimes amendments without stint or euphemism.

Today, we are to speak only of the laboratory of roentgenology in its relation to diseases of the paranasal sinuses. We may say it is a rich relation and, therefore, valuable but not vital. We may say it is a useful relation, very useful ,but not indispensable. As a matter of preference, I would not be without its aid, for it often adds weight to the positiveness of the diagnosis. As a matter of necessity, I can only say that I can not conceive of a case in which a diagnosis would lie absolutely and entirely on the x-ray findings. But this is mere philosophizing.

In point of fact, those of us who are doing sinus work must not only admit the advantages which our x-ray laboratories give us, but we are all probably prepared to argue for these advantages should any feel inclined to question them. To my mind, however, it is not in the enhancement of diagnostic positiveness that the greatest value of the x-ray lies in connection with these sinuses. It is not in the fact that your technician can often come to you with a well-made plate and say that undoubtedly pathology is present as shown by the shadow in a given sinus.

Great as such moral support for your diagnosis may be, that is still, as I conceive it, not the greatest function of the x-ray in these cases. For, no matter how competent a laboratory man you may have; no matter how complete and well-systematized your equipment and your technic, there are times, many times, when interpretation will be a matter of opinion, one may almost venture to say of imagination, rather than of fact. So obviously true is this that even so eminently skillful a roentgenologist as Dr. Frederick M. Law, whose work in this field is as luminous in its brilliancy as it is voluminous in extent, has said (*American Journal of Roentgenology,* August, 1917) :

> "It is necessary to know the history, symptoms and the clinical findings before attempting a diagnosis." * * * "Let me emphasize the absolute necessity of knowing the history and clinical findings, and the inestimable advantage of a consultation with the surgeon before attempting a complete diagnosis in these conditions."

But there is another function which the plate possesses, and, to me at least, this is the greatest of its features, namely, that every well-made plate, or rather series of plates, discloses to the observant surgeon the exact location, size and limitations of the sinus which is to be attacked, together with its anatomical relations. When one contemplates the delicacies and dangers of sinus surgery thoroughly and efficiently done, the vital relationships that must be approached, and oftentimes in a field so narrowed, crowded and obstructed as to make scientific accuracy under direct inspection well-nigh

impossible, one must come to a realization of the fact that sinus surgery is major surgery in its most refined degree; and an aid so great as this that the x-ray plate can give us must be fully and freely accepted and insisted upon by every conscientious surgeon.

The roentgenologist is fallible, very fallible, and so is the surgeon. Either may find that which he yearns to find. He may see, or think he sees, with his mind's eye what his physiological optic may not be capable of discerning. It is well, therefore, that surgeon and roengenologist consult, countercheck and counterbalance one another, to the end that the margins of safety, sanity and sufficiency be not overridden nor yet sidestepped. Certainly, speaking from the surgeon's standpoint, he has much to learn both before and after diagnosis and operation from a careful and painstaking study of the plates. It is my invariable rule.

Whether the point needs urging or not, I do not know—if not, forgive me—but of this I am sure: that the surgeon doing paranasal sinus work who fails to study the plates of his cases is laying up for himself poverty in Heaven, and will one day find that the wages of his negligence are for himself sorrow and reproach, and for his patient—death!

DISCUSSION

Papers of Drs. Dupuy, Crebbin and Jervey

Dr. H. H. Briggs, Asheville, N. C.—I think Dr. Jervey would get far better results if he would use the chin-nose, instead of the nose-forehead position of the plate, for the reason that the latter brings the base of the skull, especially the projection of the petrous portion of the temporals, up across the maxillary sinuses, thus confusing the interpretation. Even for frontal sinuses, the chin-nose position is better. It is true that the nose-forehead position is perhaps better if a view of the nostrils, of the septum, or a cross section of the turbinates is wanted, as in this position the rays fall nearly parallel to the line of the turbinates and to the axes of the nostrils. In the chin-nose position the base of the skull posterior to the middle fossæ is brought below the rays, which pass through the antrum, and consequently offer no obstruction.

Another point is that of the sinus obstructing the rays, and showing cloudy after it has been cured. This is probably due to the thickened mucous membrane, or to sclerotic changes in the bony walls, which sometimes may remain permanently, even though there be no recurrence of inflammation clinically. I know some cases which are cured where the sinuses have continued to appear cloudy on the plate for ten years, and I doubt if they will ever become clear.

I heartily agree with Dr. Jervey as to the value of the x-ray in diagnosing sinus disease. There are many cases where the true condition can only be ascertained by the aid of the x-ray plate as an auxiliary to all the other aids to diagnosis.

Dr. G. M. Maxwell, Roanoke, Va.—I am not going to quote any ancient poetry this time, but something modern, savoring near poetry:

I had a patient with an antrum,
That sometimes threw him in a tantrum
And then again sometimes he'd go quite blind
And I tried all kind of doping
Without entirely coping
With the trouble, till I thought I'd lose my mind
Then the thought was brought to me,
In a talk with one Dupuy
That the antrum in itself was not at fault
But was simply by location
Forced to carry suppuration
From the other sinuses up in the vault.
We may draw a moral then
From this fact for all you men
That men, like sinuses, are blamed a heap
For things their neighbors do,
So I'd suggest that you
Be careful of the company that you keep.

Dr. Robert C. Lynch, New Orleans, La.—When the maxillary antrum acts as a reservoir surely it is a pity to operate on the antrum: if the ethmoid is the source of the infection the diagnosis should be made of ethmoiditis rather than maxillary sinusitis. After the ethmoid is removed and the origin of pus done away with there should be more supplied to the antrum naturally. If the antral cavity mucous membrane is normal in these cases the x-rays should determine that fact, even though it may have some fluid. Such a case should be washed out or x-rayed first. Wash out the cavity, x-ray again and that should show the antrum perfectly clear, which would not be the case if there were pathology in the antrum. One might differentiate the two conditions in that way. There is every reason to believe that as we said yesterday of frontal sinus associated with ethmoiditis, there is no reason why we should not have ethmoiditis with antrum by continuity of tissue and draining of ethmoid cell into the antrum. We have been using the position described by Dr. Briggs in our x-ray plates for some time. We changed from the plates exhibited by Dr. Jervey and I am very much more in favor of the position exhibited by Dr. Briggs as giving a better interpretation of our plate. The clinical findings coincide more frequently with the findings of the x-ray plate in the Briggs than the Jervey position, using them for these particular cases.

Dr. J. A. Stucky, Lexington, Ky.—Dr. Dupuy said something this morning about the removal of the middle turbinate being necessary. I once believed that was necessary in every case, but now I find that if the middle turbinate presses upon the antral wall and interferes with free

ventilation of the cavity all that is necessary is to fracture the turbinate and push it over towards the septum and give free ventilation and drainage. I do not remove as many middle turbinates as I formerly did.

I have tried and practically given up the Denker operation through the inferior meatus. I do not regard it as clearly a surgical procedure as an operation through the canine fossa, known as the Caldwell-Luc, because you cannot keep the Denker opening as free, nor as clean. If you open through the canine fossa you can see what you are doing, and subsequent dressing and treatment is neither so painful nor so long. I rarely use any dressing or after treatment longer than three or four days. I make an opening large enough to insert a large ear speculum that I may inspect the floor and the roof of the maxillary antrum and tell without a doubt whether I have the meatus freely open or not, and know then that I have free drainage. I think formerly I caused too much traumatism and curetted too hard in the antrum. I overdid the work. It was these two points that I wanted to emphasize.

Dr. J. J. Shea, Memphis, Tenn.—Dr. Law of the Manhattan Eye and Ear Hospital, has developed a very good method of taking the sinuses which presents them in their surgical position. Briefly, the method is to produce only the parts desired on the plate and by dividing the plate into two parts to utilize one plate for both the anterposterior and the lateral views. The anteroposterior is always taken on the right side of the plate and the lateral, with the right side of the face down, taken on the left. The central rays are directed through from behind so as to be projected forward in a plane parallel to and mid way between horizontal planes, bisecting the external auditory meatus and the external canthus of the eye. The head is placed in the nose-forehead position on the plate. This projects the sinuses in the most natural shape and relationship and also cares for the distribution of the shadows, that is the shadow of the orbital plate of the frontal bone is seen in the upper third of the orbit and in the lower third of the orbit is seen the petrous portion of the temporal bone. The occipital bone's lower margin clears the floor of the antrum and so we see the sinuses in their clearest and most natural position.

The lateral view is necessary in order to establish the thickness of the anterior wall of the frontal sinus and to outline the posterior ethmoid and sphenoid cells. In centering your rays, you can favor either of these two factors, depending on which you desire the more exact in formation.

A radiograph shows not only the sinus or sinuses involved but, if studied, throws some light upon the pathological and mechanical influences of the case. If the frontals are involved, their prognosis will depend upon the condition of the ethmoids. The position of the floor of an antrum is a mechanical factor to be considered. If it is lower than that of the nares, then drainage is more difficult and in any form of radical operation, the site of the window into the nares is higher when viewed from the antrum.

An x-ray by itself or transillumination by itself is not as satisfactory as both. In our office, we have in the dark room a shadow box which is immediately over the head of the patient and by studying the two together, a better knowledge of the condition of the sinuses is obtained.

We are indebted to Dr. Lyman Chapman for the splendid pictures he has taken of our cases and the aid he has rendered us in clearing our diagnosis.

Dr. Dupuy (closing).—Repeated punctures of the naso-antral wall followed by x-ray examinations gives absolute evidence whether or not we are dealing with a fluid collection from above, or with a sinusitis in which tissue changes are present in the mucoperiosteal lining membrane. In the former the sinus will clear up after the irrigations, in the latter there will be a shadow despite the irrigations. Dr. Stucky makes the point that he would not sacrifice the middle turbinate, but merely retract it.

Dr. Stucky.—Unless it was diseased.

Dr. Dupuy.—I emphasized in the paper that such anatomical variations as an enlarged middle turbinate and a long, broad, and an obliquely placed uncinate were largely responsible for directing the flow of fluids from above toward the maxilliary sinus openings. With this view I would naturally not be satisfied with simple retraction of the middle turbinate, though it were healthy, but so as to secure perfect drainage away from the maxillary sinus. I would always perform a middle turbinectomy so as to resect the uncinate as well as the turbinate. I purposely limited my discussion to a special group of cases, the purely reservoir type. Our new found poet brings out the point very distinctly and yet with a touch of fancy that you must watch the maxillary sinus on account of the bad company it keeps. As the pus collections in the type I am discussing come from above, all surgical measures will have in view the correction of the trouble in the fronto-ethmoidal region.

Dr. Crebbin (closing).—Too much stress can not be laid on the x-ray as a factor and as a specialist. Sometimes, we depend entirely on the roentgenologist for an interpretation, whereas we should become more familiar with these pictures, and be able to interpret them ourselves.

In the short paper which I presented, I did not attempt to go into the details of the Denker operation, but tried to emphasize its superiority over others, because the opening into the nose is a permanent one, thus giving ventilation and drainage. This can be appreciated, especially if subsequent infections occur.

If the Denker operation is performed properly, there is no fear of a second operation to be done, and certainly this cannot be said of the Caldwell-Luc or any of the other similar operations.

Although this operation is an extensive one, it should be done under local anesthesia, and if drainage is used at all, this should be a very small piece of gauze, saturated with compound tincture of benzoine. The drainage is to be removed the next day, and no further drainage is to be introduced, nor is it to be irrigated at all.

The main feature, is the fact that this is a

permanent opening, and drainage and ventilation are always present.

Dr. Jervey (closing).—I wish to question the attitude that my friends Dr. Dupuy and Dr. Stucky take in regard to the maxillary sinus being the reservoir of the discharges from the other sinuses. Their physics may be all right, but their physiology is all wrong. The natural physiological process that goes on in the course of respiration creates, first of all, a vacuum in the nares that is followed by a secondary vacuum in the sinuses and a discharge in connection with the ciliary movements of the epithelium in the lining of the sinuses moving outward. There is no tendency to move inward. If you have an abnormal hiatus, if you have a common opening between some of the ethmoid cells and maxillary sinus you may well have an infection through the frontal, ethmoid or sphenoid with sneezing which often does lodge secretion in the maxillary opening and infection of the maxillary sinus results. But we can go so far as to show that even where an opening of considerable dimensions is made in the nasal wall of the maxillary antrum, thoroughly cleaned out and the mucous lining restored to its normal conditions, even with that opportunity for pus to lodge in the sinus itself, we seldom see it. In fact we almost never see it. I have seen a number of cases operated on with thorough breaking down of the nasal wall and discharge from the ethmoid and nasal sinuses but no accumulations in the antrum. Now it is perfectly true that there is necessity for drainage and drainage from the most dependent point, but I take issue, also, with Dr. Stucky in his operation through the canine fossa. I believe it is seldom justified to open through the mouth, and I do not see how it can prevent secondary infection occurring. He says with it he is sure he has good drainage through the sinus and into the nose. One of the speakers brought out the point that the lateral x-ray pictures were of great importance and I want to emphasize that point. More than once I have been called upon to go into the most dangerous portion of the ethmoid structure and I have done it with fear and trembling, but I have done it because my x-ray pictures when I studied the plate convinced me that there was an abnormal cell in an abnormal position. Occasionally you find an ethmoid cell placed up here and normally if we go into that ethmoid with cell here and strike well into the base, which is usually very thin, we have at once gotten into the position of utmost danger. An opening breaking into the orbital wall is trivial. It has happened to me once or twice and resulted in nothing serious. If we have positive evidence of the x-ray picture showing that the additional ethmoid cell is situated above and posterior to the anterior wall of the sphenoid, we can go in with satisfaction and know too we are going to clean up something that needs to be cleaned up. Another point about the necessity of removing the middle turbinate to clean up the ethmoid cells. It is particularly necessary to preserve the tissues as far as may be possible in these cases of atrophic rhinitis which we see in chronic conditions. I believe every case of atrophic rhinitis is a secondary pathologic condition which has a primary cause, whether it be frontal, sphenoidal, antrum, or all of them put together.

Southern Medical Journal

JOURNAL OF THE
SOUTHERN MEDICAL ASSOCIATION

Published monthly. Price $3.00 the year; 25 cents the single copy.
Address Southern Medical Journal, Empire Building, Birmingham, Alabama
Entered at the Birmingham, Ala., postoffice as second-class matter under Act of Congress, March 3, 1879

Dr. SEALE HARRIS, Editor
Dr. M. Y. DABNEY, Associate Editor
Dr. J. R. GARBER, Associate Editor
C. P. LORANZ, Business Manager

VOL. XIII APRIL 1920 No. 4

EDITORIAL DEPARTMENT

A STANDARD METHOD OF TREATING MALARIA

Quinine is a known specific in the treatment of malaria, yet there is a wide difference of opinion as to dosage, and as to the length of time necessary to administer it in order to disinfect completely the blood of a malaria patient. The National Malaria Committee, which meets each year at the same time and place with the Southern Medical Association, has a Sub-Committee on Research that has formulated a standard method of treatment for malaria. This committee, consisting of Drs. C. C. Bass, Chairman; Wm. Krauss, Wm. H. Deaderick, George Dock and Chas. F. Craig, has recently made a report which was submitted to the National Malaria Committee and 19 of its 20 members approved the plan of treatment. The members of this sub-committee, as well as other members of the National Malaria Committee, are among the leading authorities in the world on malaria. They have treated many thousand cases; and their conclusions are based not only on clinical results, but upon the study of blood of innumerable patients in which this and other methods of quinine dosage have been used.

It would not be possible to formulate a more authoritative treatment for any condition than that which has been given to the medical profession by the National Malaria Committee; and physicians who live in infected districts should adopt this plan of treatment with each of their malaria patients. It is not only necessary to be thorough in treatment to relieve the symptoms of the immediate attack; the quinine should be continued until there is no danger of recurrence of the infection, and until the patient is no longer a menace to others. If every physician in the infected districts of the South will follow this treatment with all their malaria patients, it will result in a tremendous decrease in the disease during this summer; and next year there will be a great reduction in the number of persons to infect the anopheles, which are harmless until they have bitten persons who carry malaria parasites in their blood through the winter.

The following is the report of the Sub-Committee on Medical Research of the National Malaria Committee:

"The Sub-Committee on Medical Research of the National Malaria Committee presents the following as a standard method of treatment of malaria for the purpose of curing the patient of his infection and recommends its general use by the medical profession. We believe that this treatment will, in the great majority of cases, prevent relapses in the patients themselves and also prevent transmission to others.

"Our opinion is based largely upon the results of the treatment by this method, under average conditions, in their homes, of a large number of persons infected with malaria.

"*For the acute attack ten grains quinine sulphate by mouth three times a day for a period of at least three or four days, to be followed by ten grains every night before retiring for a period of eight weeks. For infected persons not having acute symptoms at the time, only the eight weeks' treatment is required.*

"*The proportionate doses for children are: under one year, ½ gr.; one year, 1 gr.; two years, 2 grs.; three and four years, 3 grs.; five, six and seven years, 4 grs.; eight, nine and ten years, 6 grs.; eleven, twelve, thirteen and fourteen years, 8 grs.; fifteen years or older, 10 grs.*

"It is not claimed that this is perfect or even the best treatment in all cases, but it is our belief that it is a good and satisfactory method for practical use to prevent relapse and transmission to other people."

SURGEON-GENERAL CUMMING

The appointment of Dr. Hugh S. Cumming as Surgeon-General of the United States Public Health Service is a deserved promotion of a sanitarian of great ability. Surgeon-General Cumming is a Virginian by birth and by training, having graduated in 1893 from the University of Virginia, the institution, by the way, which trained Walter Reed, whose discovery of the mosquito transmission of yellow fever was the one greatest contribution ever made for the prevention of disease. Soon after his graduation Dr. Cumming was commissioned a surgeon in the United States Public Health Service, and for more than a quarter of a century he has served in many important positions in national health work. In college, Hugh Cumming was one of the leaders among his fellow students; and after entering the United States Public Health Service he became recognized as one of the ablest men in national health work. Therefore, he is eminently fitted for the duties of his new position and is thoroughly familiar with all the details of public health administration.

DR. HUGH S. CUMMING
Surgeon-General, U. S. Public Health Service
PHOTO BY UNDERWOOD & UNDERWOOD

Dr. Cumming was serving in Europe at the time of his appointment and he was not an applicant for the position. Hence many were surprised at his selection. However, there is no doubt that Surgeon-General Cumming has the qualities of leadership to a degree that assures his successful administration.

The fact that Dr. Cumming was the official representative of the United States Public Health Service in Europe during the War, and that he has later served on various international health boards, gives him a knowledge of the communicable diseases that are likely to be brought to the United States which will be extremely important to him as the head of the Nation's health machinery. His familiarity with public health conditions in the South make it certain that there will be increased activities in the prevention of malaria, hookworm and other tropical diseases that are problems in the states that are blessed with mild winters.

That Surgeon-General Cumming has a large vision of the needs of, and the opportunities for, the United States Public Health Service, is shown by one of his first acts on assuming the duties as head of our Governmental health activities when he called attention to the necessity

for an enlarged personnel with adequate salaries. Of course, this calls for larger appropriations from Congress; and the medical profession, particularly those engaged in practicing the great specialty of preventive medicine, should assist the United States Public Health Service in having its needs recognized by Congress. There should be ten times as many physicians as are now in the U. S. Public Health Service and the appropriations should be increased many fold.

The United States Public Health Service should be enlarged into the Nation's Department of Health. When a physician who knows of the ravages of preventable diseases and who is familiar with the measures for their prevention has a seat in the President's cabinet, then will it be realized that the paramount duty of our Government is to protect its citizens from the infections that now cause a needless waste of human life.

PROSPECTS FOR A NATIONAL DEPARTMENT OF HEALTH

The SOUTHERN MEDICAL JOURNAL is not in politics. It does not espouse the cause of any man for political office, but it is concerned in the opinions of men who are aspirants for positions in which they may help or retard progress in public health administration. For years the JOURNAL has favored the establishment of a national department of health, and is now convinced more than ever that the time is ripe to begin the agitation for enlarged governmental activities for the prevention of diseases that are of interstate importance.

It does not make the slightest difference whether the department of health comes through a democratic or republican administration. It is not a partisan question and both democrats and republicans should work together for a cause that has for its object the saving of human life. Therefore, it should be the concern of both the democrats and republicans in the medical profession to see to it that their respective favorites for the presidential nomination shall commit themselves to the policy of establishing a department of public health with a physician in the President's cabinet.

The organized medical profession should also see to it that each of the political parties has a plank in its platform favoring a national department of health. In 1912 and in 1916 the democratic, republican and progressive platforms definitely committed on a national department of health; and there is reason to believe that had not the war come on President Wilson and a democratic administration would have carried out the party pledge. It is also known that President Taft is convinced of the need of a governmental department for the prevention and control of disease. It does not seem likely that President Wilson and ex-President Taft will be the nominees of their parties, and it, therefore, behooves far-seeing physicians to inquire into the views of the known candidates.

THE ATTITUDE OF PRESIDENTIAL CANDIDATES

Friends of Senator Robert L. Owen are conducting a campaign for the selection of the Oklahoma statesman for the democratic nomination. We do not know of any utterance of Senator Owen as to what he would do regarding the establishment of a department of health should he be elected President; but his record as a Senator is known, and there is not a man in either branch of Congress who, more than Senator Owen, has so consistently favored every measure that was intended to improve public health conditions in the United States. The Owen bill for the establishment of a national department of health did not miss passage very far in 1910; and many think that had there not been a division in the ranks of the medical

profession at that time, the legislation would have been enacted. At any rate, it can be considered certain that Senator Owen as President would urge the establishment of the department of health.

There is also no question that one of the aspirants for the republican nomination would do his utmost for the proposed department of health. Since General Wood is a physician, and was Governor of Cuba when Havana was cleaned up and yellow fever eradicated from its stronghold, he knows the great good that would come to the American people by adequate public health administration. Therefore, it is natural that he should favor increasing Governmental health activities. He recently made clear his attitude on that question in the following words:

"What we need in this country is a sound national department of public health, a health bureau with a medical man at the head of it as a member of the cabinet. It does not make any difference who establishes it. It is a thing that is bound to be done. Our public health service is now scattered through a dozen different departments under as many different heads. What we need is one centralized department, nationwide in scope, to take care of all national problems of health and sanitation."

Doubtless there are physicians who are close to all the aspirants for the greater office in the gift of the American people, and they can with but little effort show them the need of a national department of health. Physicians should also see to it that both parties are pledged to this cause. Not only that; they should sound out and commit all the candidates for the United States Senate and House of Representatives to such legislation.

Physicians should inform the public of the needs for larger activities and greater appropriations for Governmental health work. When the voters realize that the United States Government can and should give adequate aid to the state health departments in preventing disease, their representatives in Washington, from President to Congressman, will be active in providing the ways and means for measures to promote the health of the Nation.

CALORIES AND VITAMINS

That the medicine of the future will be largely preventive is so well recognized as to become an axiom. As Dr. Barker pointed out in his presidential address,* the idea that preventive medicine may injure the income of doctors is entirely fallacious. A sick population is an impecunious one, and with them the ability to pay bills is low. The physician works hard on many cases of preventable illness in people who can not repay him for his services. When the public is educated and its resistance increased to a maximum by the skill of science, it is true the number of medical practitioners may be less. But as wars, accidents, and changing conditions continually bring about new diagnoses, that date is still a few hundred generations away. It should be a happy period, when doctors have few cases and plenty of time for each one, and are paid for each in proportion to the service rendered the patient.

The most important departments of preventive medicine are hygiene and nutrition. Nutrition has been until recently the least studied field of medicine, and doctors now practicing pay appallingly little attention to it. The medical schools teach little of it. The most important work that has been done on nutrition has been conducted largely outside the medical schools because the medical clinicians have felt that they had no time for it.

CALORIC VALUES

The idea of calories has obsessed some members of the medical profession and the ill-informed public for some time. Child's restaurants print on the menu the number of calories represented by each

*Barker, L. F.: The Wider Influence of the Physician. Jour. South. Med. Assn., Vol. XII, No. 12 (December, 1919), p. 719.

article, with the result that many working girls lunch on a diet rich in calories, consisting of a pie *a la mode* and doughnuts, and grow more and more anemic. When a doctor thinks of nutrition in health, he is likely to think first of calories, then sometimes of acids. He remembers acidosis.

The idea of calories has been in a sense overworked and in a sense wrongly worked. A food is considered to give off the same heat in the body that it yields on being oxidized outside. But food undergoes many reactions in the body before oxidation. In the process of digestion it must be changed from the complex colloid molecule into successively simpler and simpler products until it can pass by osmosis into the blood. There, it is further disintegrated, oxidized or synthesized and reabsorbed to form tissue. As was pointed out in an article by Chapin,* many of these reactions are anaerobic and each of them is endo or exo-thermic. The amount of heat energy used in digestion and the amount delivered to the body by any given foodstuff is then an enormously complicated problem. The net profit to the body of a food difficult to digest may be a loss. If we could solve the problem for one person and one food, it would not be true of another person or a different food. The idiosyncrasies of digestion are individual and countless. Moreover, the utilization of a given food by a given individual varies with his state of health and even with his state of mind.

Sugars and fats are articles of diet highly recommended on the basis of the caloric theory. They are easily oxidized and produce energy. Sugar also produces indigestion, perhaps on account of its high osmotic pressure. Sugar, isolated, is a comparatively new food, not more than a few centuries old, and it is a food to which our digestive tract is not fully adapted. It is because of its power of easy oxidation, probably, that the body craves it. Too much fat, like sugar, causes digestive disturbances, and for this reason, though high in caloric value, is not the best food.

Vegetarians urge that vegetable protein is better than meat. The answer to this is empirical. Vegetarian races of today are not the strong races. The ascending races are meat-eating. Perhaps the vegetable protein is less easily assimilated; and perhaps the protein is not the only useful content of the meat. There is every reason to believe, however, that an excess of meats is as harmful as a deficiency of animal protein. The investigations of Chittenden, Lusk and others seem to have proved that man can live and be most efficient on a diet in which the protein content of the food consumed is about one-third that eaten by the average individual. In other words, while meat in some form is an important constituent in diet, in the average individual it should not be taken at more than one of the three meals that a person should eat each day. Of course there are notable exceptions, such as the manual laborer and those living in cold climates.

VITAMINS

In nutrition, the thing that has been neglected most is the study and recognition of the vitamin, or vital principle, or whatever it may be, in food. Food rich in calories is of little value unless it also contains vitamins. What the vitamins are, we do not know. They have been studied principally by biochemical methods, e. g., guinea pigs or white rats are fed a diet of hay and water for a period during which the growth of the young and maintenance of the adult is studied. They are examined and weighed daily. This diet is found insufficient. It pro-

*Chapin, H. W.: Jour. A. M. A., Vol. 73, December 27, 1919.

duces a condition analogous to scurvy. By the method of trial and error, the minimum quantity of green food or other food necessary to maintain health and growth is determined. Attempts have been made to extract from the added food by treating it with different solvents, the intangible substances or substances, vitamins, necessary to life; but with little success.

Milk is one article of diet that contains all the elements of food necessary for nutrition. A pint of milk a day is said to be desirable in the diet of the average adult, not only on account of the food value of the fats, carbohydrates and proteins which it contains, but also because of the equally important vitamins, the fat soluble products and assimilable calcium. The vitamins in green vegetables and in fruits are also essential for perfect nutrition.

The best work on nutrition has been that on the diet of infants. It is well known that babies very early require something for growth besides milk. Orange juice is usually given them. It was recently proven in a New York baby hospital that strained tomato juice is efficient as a substitute for orange juice in the baby's diet. The vitamin of the tomato apparently is less easily destroyed than that of any other vegetable. Heating, canning, and dehydrating have little effect on it. All this is inexplicable on the basis of our present scientific knowledge. With our present knowledge of nutrition we must proceed more or less empirically. Doctors should keep up with the work which is being done, but not overdo any one set theory. Practical nutrition is the field *par excellence* for informed conservatism.

OYSTER AND SHELLFISH INFECTIONS

Many outbreaks of food-poisoning have been reported from eating infected oysters, and a great many more mild cases occur that never come under the observation of physicians. It is a common thing to hear persons say that at some time in their lives they have been ill from eating oysters. When one thinks that the source of our oyster supply is known to be the polluted, brackish water near the sewer outlets of cities, and when the fact is considered that millions of people eat oysters every year, it is surprising that there are not many more cases of food-poisoning from this source.

A number of epidemics of typhoid and paratyphoid fever have been traced to oysters, and no doubt many thousands of cases occurring each year originate from this source, although they cannot be traced directly to eating the succulent bivalve. The fact that the great majority of adults have had typhoid fever, and are, therefore, immune to the disease, is another reason why more cases do not occur from eating raw oysters, a food that is so liable to contamination with the bacillus typhosus.

The intestine of the oyster is filled with micro-organisms which have been taken in from the water in which oyster beds are planted, and the brackish water on which they fatten is often polluted with pathogenic bacteria. The oyster decomposes quickly, and the paratyphoid, typhoid and other bacteria that live in water, in addition to the ordinary micro-organisms of putrefaction, find it a good culture medium. There is no question that the oysters grown in polluted waters take in and retain pathogenic organisms.

NEW YORK AND RHODE ISLAND OYSTER BEDS

G. A. Johnson, of the New York City Board of Health, who has made a special study of the oyster beds around New York, says: "There is no body of water extant that has produced so many cases of typhoid in human beings as Long Island Sound. A good second is lower New York Bay, reeking in sewage and pollution from factories.

It is a crime to allow bivalves from such sources to be sold in the markets."

Since oysters are eaten raw, and since they are so apt to be contaminated, there is probably more risk in eating them than in eating most other foods. It has been proven that the heat used in cooking oysters does not destroy all the micro-organisms or toxins which they contain, but undoubtedly they are safer for human consumption when cooked in various forms than when served raw.

In a report on the sanitary conditions of the Rhode Island oyster beds, Gorham, of Brown University, states that bacteriological examinations of oysters made in summer did not agree with those made in the same bed in winter. He observed that the number of colon bacilli in the oysters increased from spring to the end of summer, reaching its maximum when the water was warmest, at which time practically every oyster showed many colon bacilli in 1-100 c.c. of "shell water." These observations afford a scientific explanation for the belief that oysters should not be eaten in summer, because of the greater danger of infection during the warm weather. Gorham suggests that four of the "R" months, "March, April, September, October" ought to be added to the season when oysters should not be eaten.

CRAB, SHRIMP AND LOBSTER INFECTIONS

The foregoing statements regarding the polluted sources of oysters and the infections which they may carry, apply to mussels, crabs, shrimp, lobsters and other shellfish that grow in brackish water. The flesh of crabs, being soft, decomposes readily and is very liable to bacterial infection. It is, therefore, very important that crab meat should be fresh and well cooked before it is eaten. The same is true of shrimp, but to a less extent. Lobster is ordinarily considered very indigestible. It is probably no more so than other meats. The fact that lobster so frequently causes indigestion is not because of the character of lobster meat, but probably because it is so frequently infected.

There is a popular belief that the combination of fish and shellfish with milk is poisonous. There is no foundation for this fallacy. It is probably due to the fact that fish, shellfish and milk are all very liable to contamination. One or the other causes the gastro-intestinal symptoms ascribed to the combination, or the affected person has an idiosyncrasy for one or the other. Some years ago, in Mobile, the writer was one of a group of eight or ten men who ate at the same place for several months. Fish, crabs, shrimp, or oysters were served every day. The person who selected them was trustworthy and there was also a liberal supply of pure milk, cream and buttermilk. All kinds of fish and shellfish were eaten at the same meals at which sweet milk and buttermilk were copiously consumed. All of the party remained perfectly well throughout the several months of a hot summer while eating popularly called dangerous combinations of milk with fish and shell food.

DISCOURAGING OUTLOOK FOR OYSTERS

It is doubtful whether there are any oyster beds close enough to cities to be successful commercially that are not contaminated. Many people who are informed regarding the source of the oysters obtainable in cities have given up the delights of the delicious flavor of raw oysters because of their fear of infection. Many others, however, are willing to run some risk for the gratification of eating shellfish.

On the basis of information collected from bacteriological investigations of the oyster beds in various parts of the country, the entire shellfish supply of the United States is under suspicion, but as yet little has been done to protect the oyster beds from sewage pollution. The

Government, however, is making efforts in this direction, having stopped to some extent the "fattening" of oysters in polluted waters. With an increasing population, the difficulties of preventing the pollution of oyster beds will become greater, and the outlook for a clean and uninfected oyster supply is not encouraging.

INDIGENT TUBERCULOUS PATIENTS ARE BEST TREATED AT HOME

Proper food and rest are two of the cardinal points in the treatment of tuberculosis. An extensive clinical observation places prime importance upon their early and protracted application, and those physicians who have greatest success in the treatment of this plague are those who look after the nutrition of their patients.

Upon the definite diagnosis of tuberculosis, or even the suspicion of a beginning tuberculous process, the unfortunate victim enters into a state of pronounced phobia and immediately seizes upon the layman's panacea for this affliction, namely, "a special climate." He, or she, may know some one who went West or to North Carolina, or to some well known tuberculosis resort; and after a few months returned "cured" of the lesion and in better health than before. Some physicians thoughtlessly fall into the same error and ascribe the arrest of the process to the climatic change. And, thus, the vicious circle in the cause to effect reasoning is established and the person with a tuberculous indictment against him feels that his one hope lies in a climatic change.

The Denver Anti-Tuberculosis Society has prepared a concise brief* against the promiscuous dispatching of indigent tuberculous patients to any place of far distance for treatment, and incidentally sounds the warning to those of the medical profession who place dependence solely upon climatic change with no thought being given to proper food, rest and fresh air. This association very logically points out the physical impossibility of providing sanatoria accommodations for all who apply, and many of such applicants are from far away, having gone to their destination without knowing anything relative to possible arrangements.

The brochure sent out by the Denver Society proceeds further to point out the problems of the tuberculous pilgrims. Sometimes they arrive almost destitute, and in order to maintain an existence they seek light work, which thwarts the plan of intensive treatment. Periods of despondency, homesickness, anxiety and the feeling of helplessness mitigate the chances of improvement or recovery and finally the fight is ended in death. A "stay-at-home" treatment would have provided the essential rest, diet, fresh air and medical attention which are the essentials in the treatment of tuberculosis. The pinch of poverty would not be experienced, and, above all, mental relaxation would be assured.

The Denver Anti-Tuberculosis Society concludes its summary of the unwise practice of advising a change for the tuberculous patient just for the sake of climate by advocating the wholesome plan of securing such action that each state of the Union will have adequate sanatoria equipment to care for its own tuberculous, especially the indigent class.

*"Why Tuberculous Persons Without Funds Should Not Leave Home," Denver Anti-Tuberculosis Society, 221 Coronado Bldg., Denver, Colo.

Correspondence

Baltimore, Md., March 2, 1920.

Editor SOUTHERN MEDICAL JOURNAL:

The undersigned would like to enter into communication with physicians who may be located in malaria districts, in reference to securing post-mortem material from fatal cases of malaria for purposes of investigation.

Any aid that may be afforded us in this connection we will deeply appreciate.

C. E. SIMON,
R. W. HEGNER,
The Johns Hopkins University,
School of Hygiene and Public Health.

Book Reviews

Industrial Nursing. For Industrial, Public Health, and Pupil Nurses, and for Employers of Labor. By Florence Swift Wright, R.N., Bureau of Child Hygiene, New Jersey State Department of Health; Formerly Secretary, Benefit Association of Employees of John Wanamaker, New York; and formerly in charge of Industrial Nursing for both the Cheney Brothers' Silk Mills and the Clark Thread Company. 179 pages. New York: The Macmillan Company. 1919.

Miss Wright begins with a brief account of the history of industrial nursing. She discusses the relations of the nurse with her fellow workers, and with the community. The work of the nurse with a small industrial plant is chiefly dealt with, because her duties are more varied. The first aid nurse and the equipment of the first aid room are described, and the question of the nursing mother who works is discussed. Laws providing for maternity benefits are urged.

The book contains little technical information other than first aid treatments. It shows sympathy with, and understanding of, its subject.

A Textbook of Chemistry for Nurses. By Fredus N. Peters, A.M., Ph. D., Author of "Experimental Chemistry," "Laboratory Experiments," "Modern Chemistry," etc.; formerly Professor of Chemistry and Director of Laboratories, Kansas City College of Pharmacy; Professor, Organic Chemistry, Hahnemann Medical College; Director of Laboratories and Professor of Chemistry and Metallurgy, Kansas City Dental College; Head of Science Department, Kansas City Central High School. 302 pages, illustrated. St. Louis: C. V. Mosby Company, 1919.

Chemistry is coming into its own in medicine. This text book contains more information on general chemistry than is usually given nurses—not more than they need. The usual subjects and theories of inorganic chemistry are discussed as simply as possible, with questions at the ends of chapters. The history of the discovery, methods of preparation, and chief characteristics and uses of the common elements are given. A chapter on the common poisons relates it more closely to medicine. The facts are pleasingly given and well chosen.

Cerebro-Spinal Fluid in Health and in Disease. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School; Associate Pediatrician, Sarah Morris Children's Hospital of Michael Reese Hospital, Chicago; Attending Pediatrician, Mount Sinai Hospital, Chicago; Attending Physician, Children's Department, Chicago Winfield Tuberculosis Sanatorium. With a Foreword by Ludvig Hektoen, M. D. 223 pages with 56 illustrations including 5 colored plates. St. Louis: C. V. Mosby Co., 1919.

The subject is treated exhaustively and yet in such a manner as not to be confusing. Beginning with the history in chapter 1, the author then takes up the anatomy and physiology of the spinal cord. Illustrations explanatory to the text accompany this chapter. Physiology of the fluid is discussed, as is characteristic of the entire work, by dividing it into topics and each subject is treated individually, followed by a summary at the end of the chapter. Methods of obtaining cerebro-spinal fluid from the living body comprises chapter 3. The properties of normal cerebro-spinal fluid are then taken up, followed by a chapter on pathologic cerebro-spinal fluid. The chapter on methods of examination for diagnostic purposes is preceded by this remark: "I shall describe only those methods that have been proved to be both simple and practical, thus eliminating tedium and bringing to the reader only points of value." Where several tests are mentioned, the author discusses their comparative value in a separate paragraph leaving the reader to judge for himself. Photographs, charts, colored plates and microphotographs illustrating and explaining various tests, accompany this chapter. Chapter 7 on "Cerebro-spinal Fluid in Various Diseases" is probably the most valuable in the book, both from a laboratory and clinical aspect as it takes up under the headings of diseases in which the fluid is altered, the pathologic changes which occur in each. The chapter on intraspinal treatment covers the administration of drugs and serum intraspinally in various diseases and discusses the value of one. The final chapter is a brief summary which includes several suggested lines of research on the cerebro-spinal fluid. At the end of each chapter appears a bibliography, and the appendix gives a list of monographs on cerebro-spinal fluid. The book is of undoubted value to the profession as it brings out the importance of cerebro-spinal fluid in a brief, chronological manner which is as intelligible to the beginner or student as it is to the clinician or specialist.

Southern Medical News

ALABAMA

Dr. Walter A. Weed and Dr. J. A. Meadows announce the consolidation of their Radium and X-Ray Laboratories, Empire Building, Birmingham.

It has been announced that the Montgomery Memorial Hospital has received subscriptions amounting to $132,000 for its building.

At the request of the medical profession in Mobile a pathological laboratory will be built at the City Hospital by the City Commission.

Dr. B. Cosby Bird announces the opening of his offices in the First National Bank Building, Montgomery.

Dr. B. Frank Jackson announces the opening of offices in the Bell Building, Montgomery, practice limited to eye, ear, nose and throat.

Deaths

Dr. L. W. Philips, Girard, aged 84, died January 22.

Dr. C. E. Blanton, New Market, aged 66, died February 20 from pneumonia.

Dr. J. E. Kendrick, Luverne, aged 74, died February 15.

Dr. E. B. King, Montgomery, died March 25.

ARKANSAS

Fire damaged St. Luke's Hospital, Little Rock, to the amount of $45,000.

Dr. J. G. Hilton has been made Health Officer for Mena.

An intensive community health campaign has been launched in White County by Dr. C. W. Garrison, State Health Officer. White County was chosen for the initial demonstration of the work because it represents all phases of natural conditions and types of living conditions, it was said.

Deaths

Dr. L. J. Gillespie, Hope, aged 68, died March 9 from pneumonia.

Dr. Wm. J. Willim, Wynne, aged 66, died January 21.

DISTRICT OF COLUMBIA

Deaths

Col. Louis A. LaGarde, Medical Corps, U. S Army, Washington, died March 8 from an apoplectic stroke on a train from Chicago, where he attended the meeting of the National Board of Medical Examiners.

Dr. G. C. Ober, Washington, aged 59, died in Providence Hospital, February 25, from erysipelas.

Dr. J D. Hall, Col. M. C., U. S. A., Washington, aged 77, died February 25.

Dr. W. R Buchanan, Washington, died March 4 after a long illness.

FLORIDA

The Columbia College, at Lake City, has been purchased by the United States Public Health Service and will be converted into an Army Hospital.

Dr. Wm. J. Buck, Assistant State Health Officer, has been appointed Vice-President of the Brussels Congress, and is to be a delegate to the Congress at the University of Brussels, May 20-24.

Dr. B. C. Dodds has removed from Huntingdon, Tenn., to Sanford, Fla.

Dr. J. J. Robbins, Gulfport, recently married Mrs. Elizabeth Tabor, of Hubbardston, Mich.

Deaths

Dr. Joseph Mickler, Tampa, aged 33, died March 5 from typhoid fever.

(Continued on page 36)

The Scarcity of Nurses

is acutely aggravated by the prevalence of dysmenorrhea among them; many are "off duty" from that cause several days each month—to the detriment of the service which is so important to you in your practice.

Litzenberg's results with benzyl-benzoate seem to prove that much of this "off duty" can be eliminated—thereby increasing the potential efficiency of your nurses and their service to you and your patients.

Our gelatin globules of the c. p. drug—"Benzylets"—are procurable in boxes of 24 from your druggist.

SHARP & DOHME

LET

P-M CO. PHARMACEUTICALS

be your choice whenever you want true drug action via the Gastro-Intestinal route.

Our products are true to name and represent the most potent and active formulae that careful selection, careful testing, careful manipulation and careful study of the composition of the different preparations allow.

They meet your requirements for a means of supplying medication to the particular patient; being easily administered because of their palatability and appearance. Our twenty years of endeavor have been directed toward the manufacture of the best in Pharmaceuticals of

A TRUE LINE

Did we get your request for our new, up-to-date catalogue?

PITMAN-MOORE COMPANY

PHARMACEUTICAL & BIOLOGICAL CHEMISTS

INDIANAPOLIS U.S.A.

(Continued from page 304)

GEORGIA

Decatur County has adopted the Ellis Health Law and will soon begin operating, with a full-time Commissioner of Health in charge. This will give the State a total of seventeen counties with full-time health departments.

The "Keeping Fit" Campaign for boys and young men, with Mr. James P. Faulkner in charge, is progressing and the State will soon be organized.

The Chamber of Commerce of Fitzgerald recently held a special meeting, with the County Medical Society as its guest, the object being an organized effort against vice and venereal diseases. As a result of the meeting a free clinic will be organized.

Mr. J. P. Cooper, Rome, has furnished the means for securing an ample supply of radium for the establishment of a Department of Radium Therapy at the Harbin Hospital, Rome.

Drs. R. M. and W. P. Harbin announce the association of Dr. Wm. Howard Lewis, for four years member of the diagnosis staff of the Mayo Clinic, who has assumed charge of the Department of Internal Medicine of the Harbin Hospital, Rome.

The Second District Medical Association met in Albany, February 13. The present officers were re-elected: Dr. W. L. Davis, President; Dr. W. H. Hendrix. Vice-President; Dr. A. W. Wood, Secretary-Treasurer. The next meeting will be held at Thomasville the second Friday in August.

Dr. G. C. McClure, Ball Ground, married Miss Pearl Gober, of Dawsonville, at Atlanta, February 25.

Deaths

Dr. A. F. Durham, Sparta, aged 54, died January 30 from valvular heart disease.

KENTUCKY

Dr. John W. Hamilton has been appointed director of the full-time Health Department which will soon be created in Daviess County.

Several physicians of Madisonville will purchase the Y. M. C. A. building, now occupied by Madisonville Hospital, and will continue to use it as a hospital.

The following officers have been elected for Clay County Medical Society: Dr. J. R. Burchell, President; Dr. H. C. Hornsby, Vice-President; Dr. J. L. Anderson, Secretary-Treasurer.

Officers for Fulton County Medical Society are: Dr. J. M. Hubbard, President; Dr. H. Alexander, Vice-President; Dr. J. A. Phelps, Secretary-Treasurer.

Officers for Hancock County Medical Society are: Dr. F. M. Sherman, President; Dr J. T. Milner, Vice-President; Dr. J. H. Harrison, Secretary-Treasurer.

New officers for Todd County Medical Society are: Dr. E. T. Riley, President; Dr. J. T. Standard, Vice-President; Dr. W. E. Bartlett, Secretary-Treasurer.

New officers for Owsley County Medical Society: Dr. W. H. Gibson, President; Dr. Z. M. Abshear, Vice-President; Dr. C. M. Anderson, Secretary-Treasurer.

Officers for Pike County Medical Society elected as follows: Dr. Z. A. Thompson, President; Dr. J. W. Vicars, Vice-President; Dr. M. D. Flanary, Secretary-Treasurer.

Officers elected for Allen County Medical Society are: Dr. G. R. Keen, President; Dr. L. Graves, Vice-President; Dr. C. A. Calvert, Secretary-Treasurer, all of Scottsville.

The following have been elected officers for Bell County Medical Society: Dr. J. H. Morrison, President; Dr. Mason Combs, Vice-President; Dr. T. T. Gibson, Secretary-Treasurer.

Deaths

Dr. S. R. Guthrie, Franklin, aged 32, died at his home February 21 from pneumonia.

Dr. H. A. Moorman, Owensboro, aged 76, died February 24 from heart disease.

Dr. J. M. Robinson, Guthrie, aged 64, died February 26 from carcinoma of the stomach.

Dr. Louis Kaelin, Louisville, aged 62, died December 29 from bronchiectasis.

(Continued on page 38)

DR. WILLIAM KRAUSS'

Physicians' Laboratory

DESOTO STATION, MEMPHIS, TENN.

Dr. Stingily's connection with my laboratory has terminated, he having resumed charge of the Mississippi State Laboratory, with enlarged facilities for carrying on this important work.

Requests for laboratory work of every description from the friends of the firm of KRAUSS & STINGILY will, as heretofore, be executed to the best of my ability.

Will gladly assist small private and hospital laboratories in solving their troubles.

The control of

Rheumatic Pain

by the application of

K-Y ANALGESIC

("The Greaseless Anodyne")

will be found a valuable adjunct to your internal treatment. Repeat as often as necessary. Always wash off previous application

Samples on request

Mention this Journal

Headache and Neuralgia

are relieved by the rubbing in of

K-Y ANALGESIC

"The Greaseless Anodyne"

"A safe, harmless way that works most of the time"

Samples on request

Mention this Journal

In Your Last Confinement Tear

what would you have given to have had a

"Van Horn"

Obstetrical Suture

(Chromic Catgut)

in your bag?

You could have put your stitches in quickly, conveniently, safely. Why not be prepared for your next confinement tear?

Get one of these sutures from your dealer

No samples

Effective Surgical Lubrication

is assured by the use of

K-Y LUBRICATING JELLY

Contains no grease, soluble in water, easily removed, does not stain the skin or clothing. Non-irritating, soothing and emollient.

Samples on request

Mention this Journal

Johnson & Johnson

NEW BRUNSWICK, N. J., U.S.A.

(Continued from page 36)

Dr. R. H. Starks, Benton, aged 65, died February 26 from Bright's disease.

LOUISIANA

Loyola Post Graduate School of Medicine, New Orleans, has removed to 1533 Tulane Avenue.

The American Medical Association will meet in New Orleans April 26-30.

Clinics for visitors at the American Medical Association, New Orleans, will be held at the Charity Hospital, the Eye, Ear, Nose and Throat Hospital, Touro Infirmary, Hotel Dieu and the Presbyterian Hospital. These clinics will be arranged for Thursday, Friday and Saturday of the week before the meeting, April 22, 23, 24; for Monday and Tuesday of the meeting week, April 26 and 27; and for the Saturday following, May 1. In accordance with hospital customs in New Orleans, the operative clinics will be held in the forenoon, the non-operative in the afternoon.

A buffet luncheon for the visiting women physicians at the American Medical Association meeting is to be given by the women physicians of the Southern Medical Association on April 27, at the St. Charles Hotel, New Orleans.

The annual banquet for women Physicians at the American Medical Associational meeting is to be given at the Louisiane, April 28, at 6:00 p. m. Reservations should be made through Dr. Margaret P. Bouden, 1217 Calhoun Street, New Orleans. Four dollars per plate.

The American Association of Anesthetists will meet in New Orleans April 26-27.

The following officers have been elected for Lafourche Parish Medical Society: Dr. J. M. Hubert, Allemands, President; Dr. E. A. Kleinpeter, Thibodaux, Vice-President; Dr. Philip J. Dansereau, Thibodaux, Secretary-Treasurer.

The annual meeting of the Association of Military Surgeons of the United States will be held in New Orleans, April 22-24.

The Radiological Society of North America will hold its meeting in New Orleans, April 23-24.

The fifty-first annual meeting of the American Medical Editors' Association will be held at the Grunewald Hotel, New Orleans, La., on Monday and Tuesday, April 26 and 27 (during the week of the A. M. A. Convention), under the presidency of Dr. Seale Harris, Editor of the Southern Medical Journal.

Dr. R. W. O'Donnell, Monroe, married Miss Jennie May Conway, of Shreveport, February 19.

Dr. H. R. Unsworth, New Orleans, married Miss Elizabeth Elmer McCall, of New Orleans, March 12.

Deaths

Dr. J. S. Thibaut, Donaldsonville, aged 60, died in Touro Infirmary, New Orleans, February 12.

Dr. E. H. Duffel, Napoleonville, aged 44, died in New Orleans, February 28.

Dr. W. H. Cooper, New Orleans, died recently at Greensboro, N. C., from paralysis.

MARYLAND

It has been announced that the libraries of the Johns Hopkins Hospital, the School of Hygiene and the Medical School will be consolidated in a new building to be erected in the hospital group.

The Morrow Hospital, Baltimore, under charge of the United States Public Health Service, State Board of Health and Health Department of Baltimore, for the advancement of social hygiene and treatment of venereal disease, was opened in February.

Deaths

Dr. G. A. Thiede, Baltimore, aged 47, died February 16.

Dr. H. G. Alexander, Deal Island, aged 50, died February 12 from influenza.

Dr. L. W. Knight, Baltimore, aged 75, died March 16.

Dr. R. K. Robinson, Belair, aged 87, died March 9.

Dr. C. S. Grindall, Baltimore, died recently at the Hospital of the Sisters of Bon Secours.

MISSISSIPPI

According to Field Supervisor H. E. Hingst, good progress is being made on the preliminary survey for

(Continued on page 40)

Laboratories of Drs. Bunce and Landham

ATLANTA, GEORGIA

Allen H. Bunce, A.B., M.D.
Director Pathological Dept.

Jackson W. Landham, M.D.
Director X-Ray Dept.

THE WASSERMANN TEST

"I can not urge too strongly upon the profession the necessity for submitting material for this test to well-qualified serologists if reliable results are to be obtained."

—Charles F. Craig, M.D., Col., M.C. U.S.A.
The Wassermann Test, Mosby, St. Louis.

We perform these tests every day in the week except Sunday. Reports wired upon request.

Fee lists and containers for pathological specimens and information in reference to X-Ray work furnished upon request.

Address

DRS. BUNCE AND LANDHAM, Healey Bldg., Atlanta, Georgia

Autacoid Preservation

in Animal Derivatives is Essential

Exact Methods of manufacture by technical experts and control of the *Raw Material* are necessary to insure it.

Owing to faulty methods of preservation many products from this field are inert when used.

Why Not Specify

and be sure the agent used is made from fresh material and represents the maximum activity.

A very interesting issue of "The Autacoid and Suture" is ready for mailing—send for it—

Did you get our catalog?

HOLLISTER-WILSON LABORATORIES

4221 South Western Boulevard Chicago, Illinois

Investigate and Prove

the practical value of the modern antiseptic agents

Acriflavine GH
Proflavine GH

by local application, intramuscular, intravenous or urethral injection

In Suppurating Wounds, Septic Infection, Acute or Chronic Urethritis

No precipitation of albumin. Neither inhibit phagocytosis nor delay tissue repair. Diffusible. Potency increased by presence of blood serum. Powerfully antiseptic against staphylococcus aureus, streptococcus, bact. coli., enterococcus anaerobes and gonococcus. **ACRIFLAVINE GH** and **PROFLAVINE GH** are far less irritating and toxic than the acridinium derivatives used abroad or formerly sold in this country. A clinical trial will conclusively demonstrate and convince. **ACRIFLAVINE GH** and **PROFLAVINE GH** have been accepted by the Council on Pharmacy and Chemistry of the A.M.A. for new and non-official remedies.

Send for literature, directions, price lists, etc.

Heyl Laboratories, Inc.

437 Barretto Street NEW YORK

The fightin' men prefer the fightin' company

The Medical Protective Co.,
Fort Wayne, Indiana.

Gentlemen:—Now that I have returned from sea since having been surgeon on the U. S. Ship " . . . . ," when she was sunk by a submarine, and narrowly escaped with my life, having been twenty hours on a stormy sea in an open life boat: I have resumed practice at the above address and desire to renew my protective contract with your company, I remain,

Very truly yours,

B. E. S.

For Medical Protective Service Have a Medical Protective Contract

THE MEDICAL PROTECTIVE CO.
of
Fort Wayne, Indiana
Professional Protection Exclusively

Personal Laboratory Service

At a reasonable price

Wassermann test	$5.00
Large Gold sol.	5.00
Tissue diagnosis	5.00

Blood Chemical Analysis

Routine—

Smears	$2.00
Urinalyses	2.00
Cultures	2.00
Widals	2.00

Dog heads for Negri bodies.

Autogenous vaccines put up in separate ampules.

I CAN ONLY HOPE TO GROW BY EFFICIENT SERVICE

DR. J. S. FLEMING

Exchange Bldg. Memphis, Tenn.

(Continued from page 38)

the malaria campaign in Canton, Madison County. The work is being done by the city of Canton under the supervision of the State Board of Health and in co-operation with the Rockefeller Foundation.

Dr. John A. Mead, Logtown, has been appointed Health Officer for Hancock County.

Dr. Wm. I. Marsalis, Centerville, has been elected Health Officer for Wikinson County.

The City Council of Columbus has made an appropriation of $3,000 for carrying out a malaria survey.

At the recent meeting of the State Board of Health, held in Jackson, Dr. J. H. McNeill, Olive Branch, was elected President, and Dr. W. S. Leathers, University, re-elected Secretary and Executive Officer.

Dr. J. O. Ringold, Vaiden, was recently elected Health Officer for Montgomery County.

Dr. A. L. Chapman, Hermanville, married Miss Mary Belle Hollingsworth, of Crystal Springs, February 28.

Deaths

Dr. S. B. Flynt, Meridian, aged 57, died in a hospital at El Paso, Texas, February 14.

Dr. J. W. Dulaney, Greenwood, aged 73, died in St. Joseph's Hospital, Memphis, Tenn., March 2, after an operation for appendicitis.

Dr. F. M. Brougher, Belen, aged 62, died February 14 from heart disease.

MISSOURI

The Missouri State Roentgen Society will hold its first meeting Monday, April 5.

A health survey by the United States Public Health Service and the Missouri Tuberculosis Society, under the auspices of the Cape Girardeau County Health Society and Tuberculosis Association, has been started. A thorough survey will be made in Cape Girardeau, to be followed by one in Jackson and then carried to every school district in the county.

The annual meeting of the National Tuberculosis Association will be held in St. Louis, April 22-24.

Dr. G. Canby Robinson, Dean of Washington University Medical School, has resigned to accept a position as Dean and Professor of Medicine in Vanderbilt University, Nashville, Tenn.

Dr. A. W. McAlester, Columbia, and Dr. Woodson Moss, Columbia, have been elected honorary members of the Boone County Medical Society on account of their long service in the profession.

The annual meeting of the Missouri State Medical Association will be held at Jefferson City, April 6-8.

Dr. G. A. Bradfute, Caruthersville, married Miss Helen Larkey, of Memphis, February 7.

Deaths

Dr. E. C. Rieger, Kansas City, aged 41, died January 22 from pneumonia.

Dr. A. F. Koetter, St. Louis, aged 48, died in the Barnes Hospital, St. Louis, February 28.

Dr. R. C. Forsyth, Kirkwood, aged 40, died in St. Luke's Hospital, St Louis, February 8 from influenza.

Dr. L. L. Gray, Unionville, aged 58, died December 20 from acute pancreatitis.

Dr. G. M. Stelzleni, St. Louis, aged 58, died February 14 from pneumonia.

Dr. G. W. Baker, Springfield, aged 72, died March 2 from pneumonia.

Dr. E. S. Quinn, Kirksville, aged 59, died February 24.

Dr. J. M. Ferguson, Sedalia, aged 80, died March 6.

Dr. J. Freymann, Kansas City, aged 73, died February 13.

Dr. Barton Pitts, St. Joseph, died suddenly following an attack of heart trouble, early in March.

Dr. J. H. Bronaugh, Calhoun, aged 81, died January 14.

NORTH CAROLINA

The annual meeting of the Medical Society of the State of North Carolina will be held in Charlotte, April 20-22.

The Tri-State Medical Association of the Carolinas and Virginia, which met in Charlotte, February 19, elected Dr. J. P. Munroe, Charlotte, President. Spartanburg was selected as the meeting place for 1921.

Dr. A. J. Crowell, Charlotte, has been appointed a member of the Board of Health, to succeed Dr. E. C. Register, deceased.

(Continued on page 42)

Weaning Time

For weaning purposes, Borden's Eagle Brand is an invaluable food—either for supplemental feedings or as a complete substitute for Nature's supply.

Eagle Brand is pure milk and sugar condensed together in definite proportions. It is prepared under sanitary conditions that positively protect the product from contamination in every step of its manufacture.

Borden's Eagle Brand for over three generations has been the standard infant food. Physicians can prescribe it, with utmost confidence in its dependable uniformity, ease of digestion and assimilation, and high nourishing and body-building value.

Samples, analysis and literature on request.

The Borden Company

Borden Building New York

Borden's
EAGLE BRAND

Made to Easily Digest

Food Cells All Exploded

Puffed Wheat is whole wheat, better-cooked than wheat ever was before.

The process was invented by Prof. A. P. Anderson, formerly of Columbia University. And it is this:

Whole grains are sealed in huge guns, then revolved for an hour in 550 degrees of heat. The trifle of moisture inside each food cell is thus changed to steam.

Then the guns are shot and the steam explodes. Over 100 million explosions occur in each kernel—one for every food cell.

The grains are puffed to bubbles, eight times normal size. They become flavory tidbits, thin and crisp and flimsy. And every granule is fitted to easily digest.

So with all the Puffed Grains. All are steam-exploded. All are delightful foods. You find many conditions where such foods are ideal for your purpose.

The Quaker Oats Company
Chicago

Puffed Wheat
Puffed Rice
Corn Puffs

3282

SAVE MONEY ON

YOUR X-RAY SUPPLIES

Get our price list and discounts on quantities before you purchase

HUNDREDS OF DOCTORS FIND WE SAVE THEM FROM 10% TO 25% ON X-RAY LABORATORY COSTS

AMONG THE MANY ARTICLES SOLD ARE

X-RAY PLATES. Three brands in stock for quick shipment. PARAGON Brand, for finest work; UNIVERSAL Brand, where price is important.

X-RAY FILMS. Duplitized or Dental—all standard sizes. Eastman, Ilford or X-ograph metal backed. Fast or slow emulsion.

BARIUM SULPHATE. For stomach work. Finest grade. Low price.

COOLIDGE X-RAY TUBES. 5 styles, 10 or 30 millamp.-Radiator (small bulb), or broad, medium or fine focus, large bulb. Lead Glass Shields for Radiator type tubes.

DEVELOPING TANKS. 4 or 6 compartment, stone tanks. These will end your dark room troubles. 5 sizes of Enameled Steel Tanks.

DENTAL FILM MOUNTS. Black or gray cardboard with celluloid window or all celluloid type, one to eleven film openings. Special list and samples on request. Price includes imprinting name and address.

DEVELOPER CHEMICALS. Metol, Hydroquinone, Hypo, etc.

INTENSIFYING SCREENS. Patterson, TE, or celluloid-backed screens. Reduce exposure to ¼th or less. Double screens for film. All-metal cassettes.

LEADED GLOVES AND APRONS. (New type glove, lower priced.)

FILING ENVELOPES with printed X-ray form. (For used plates.) Order direct or through your dealer.

PARAGON X-RAY PLATES

If You Have a Machine Get Your Name on our Mailing List.

GEO. W. BRADY & CO.

780 So. Western Ave. CHICAGO, ILL.

(Continued from page 40)

It is understood that the Charlotte Medical Journal, edited and published by the late Dr. E. C. Register for nearly 30 years, will be continued. Dr. J. C. Montgomery and Mrs. E. C. Register will direct the publication.

Deaths

Dr. E. C. Register, Charlotte, died in the Charlotte Sanatorium, February 18 from pneumonia.

OKLAHOMA

Construction will soon begin on a modern hospital for Sapulpa.

One million dollars of the $1,500,000 given to charity by Jackson Barnett, Henryetta, reputed to be the richest full-blooded Indian in the world, will be used in the establishment and maintenance of a hospital at Henryetta.

Deaths

Dr. W. H. Crutcher, Bartlesville, aged 37, died February 12 from pneumonia.

Dr. W. Vandervoort, Guthrie, aged 80, died March 11.

Dr. J. O. Sandercook, Oklahoma City, aged 70, died in Denver February 6 from pneumonia.

Dr. H. H. Wynne, Oklahoma City, aged 60, died the latter part of February.

SOUTH CAROLINA

The mess hall and galley of the Naval Hospital at Charleston were destroyed by fire February 19.

Dr. W. A. Barnett, Greenwood, has resigned as City Health Officer.

The Charleston Chapter of the American Red Cross has presented its ambulance to the Roper Hospital at Charleston.

Dr. John W. Parker, Greenville, announces that he has opened a complete clinical laboratory and has secured as director Dr. T. R. W. Wilson, formerly Chief of Laboratory, Base Hospital, Camp Shelby.

(Continued on page 44)

PATHOLOGICAL DEPARTMENT

OF THE

SOUTH HIGHLANDS INFIRMARY

BIRMINGHAM, ALA.

Pathological, Bacteriological, Serological and Chemical Examinations

Wassermanns $5.00 *Tissue Diagnosis $5.00*

Other charges in proportion.

WALTER C. JONES, A. M., M.D., Director

USE—

"Horlick's"

the Original and Genuine

Recognized as Standard by the medical profession, who, for over a third of a century, have proven its reliability in the feeding of infants, nursing mothers, convalescents and the aged.

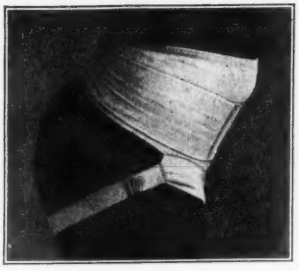
Samples prepaid upon request

Horlick's Malted Milk Co.

Racine, Wis.

THE STORM BINDER AND ABDOMINAL SUPPORTER

Patented



Adapted to the use of men, women and children for any purpose for which Abdominal Support is needed

Ask for Descriptive Literature

Our January business for 1920 has broken all records. **Note our new address.** Largely increased facilities will make it possible for us to fill mail orders in 24 hours after they are received.

KATHERINE L. STORM, M.D.,
1701 Diamond Street
Philadelphia

SAVE TWO-THIRDS

Sherman's Bacterial Vaccines

when administered early, will reduce the average course of acute infections like

Pneumonia, Broncho-Pneumonia, Sepsis, Erysipelas, Mastoiditis, Rheumatic Fever, Cold, Bronchitis, etc.

to less than one-third their usual mortality and duration.

Sherman's Bacterial Vaccines are prepared in our specially constructed Laboratories, devoted exclusively to the manufacture of these preparations and are marketed in standardized suspensions.

Write for Literature.

MANUFACTURER OF BACTERIAL VACCINES

G. H. SHERMAN, M.D.
Detroit, Mich.
U.S.A.

We Offer Southern Practitioners Exceptional Laboratory Service at Reasonable Rates.

WRITE TO US FOR FEE LIST AND A SUPPLY OF CONTAINERS.

Our work covers every department of laboratory diagnosis: Wassermann Tests, Tissue Examinations, Feces, Blood Smears, Spinal Fluid, etc.

WE PROMISE OUR CLIENTS EXCELLENT SERVICE AT ALL TIMES.

ADAMS-GRADWOHL LABORATORIES,

Canal & Burgundy Sts., New Orleans, La.

Dr. Geo. B. Adams, Director

(Continued from page 42)

The South Carolina State Medical Association will hold its annual meeting in Greenville, April 20-21.

TENNESSEE

The Tennessee State Medical Association will hold its meeting in Chattanooga, April 6-8.

The American Proctologic Society will hold its meeting in Memphis, April 22-23.

The Rutherford County Medical Society met February 4 and elected the following officers: Dr. Mat B. Murfree, President; Dr. J. M. Shipp, Vice-President; Dr. J. A. Scott, Secretary-Treasurer.

A citizen of Memphis, who refuses to reveal his identity, has presented an x-ray machine of the most improved type to the Crippled Children's Hospital.

It is understood that there is a probability that the unit of the State Board now operating in Gibson County will be moved to Clarksville for a complete health survey of Montgomery County and an educational campaign along lines of sanitation. It is understood that this survey will entail an expenditure of probably $13,000.

Dr. Wm. Britt Burns has been elected President of the Memphis Physicians' Business Bureau. The following are other officers elected: Dr. W. T. Black, Vice-President; Dr. J. C. Ayers, Secretary-Treasurer; Dr. J. B. Everette, member of the Board of Retail Credit Association from the bureau.

Meharry Medical College of Nashville (colored) has received a gift of $150,000 from the General Educational Board at New York.

Deaths

Dr. Samuel Hunt, Jr., Knoxville, aged 29, died February 23.

Dr. Wm. B. Maney, Nashville, aged 85, died February 22.

Dr. M. N. Alexander, Pleasant Shade, aged 61, died February 10.

TEXAS

The Bexar County Medical Association, San Antonio, has completed negotiations for the purchase of the Julius Appler property. Meetings of the society will be held in this building.

The campaign to raise San Antonio's share of the general fund for the hospital for tubercular soldiers of Texas, to be built by the Benevolent War Risk Society, has been started by a joint committee of the Alamo Post, American Legion and Chamber of Commerce, and will be carried on until the full amount is raised.

The following officers have been elected for Parker-Palo Pinto County Medical Society: Dr. P. R. Simmons, Weatherford, President; Dr. E. F. Yeager, Mineral Wells, Vice-President; Dr. Austin F. Leach, Weatherford, Secretary-Treasurer.

New officers for Austin County Medical Society are: Dr. J. A. Neely, Bellville, President; Dr. J. Kroulik, Bellville, Vice-President; Dr. O. E. Steck, Bellville, Secretary-Treasurer.

Following are officers elected for Henderson County Medical Society: Dr. M. M. Moss, Brownsboro, President; Dr. Don Price, Athens, Secretary-Treasurer.

Officers elected for Wharton-Jackson County Medical Society are as follows: Dr. D. P. Redwine, President; Dr. H. V. Reeves, Secretary-Treasurer, both of El Campo.

Kaufman County Medical Society met recently and elected the following officers: Dr. F. S. White, Terrell, President; Dr. W. I. Swangem, Terrell, Vice-President; Dr. B. J. Hubbard, Kaufman, re-elected Secretary-Treasurer.

Officers for Brazoria County Medical Society are:

(Continued on page 46)

HIGHPOWER
Electric Centrifuges

Send for Cat. Cn

INTERNATIONAL EQUIPMENT CO.
253 WESTERN AVE. BOSTON, MASS

MERCURIAL (Grey) OIL - - - - - - - - $1.50

One of the New and Nonofficial Remedies. A valuable adjunct in the treatment of syphilis. Put up in syringes, each syringe containing 10 doses. Credit of 50c upon return of syringe.

Pamphlet sent upon request.

WASSERMANN TEST (Blood or Spinal Fluid) - - - - - $5.00

We do the classical test. Any of the various modifications will be made upon request, without additional charge.

Sterile containers, with needle, gratis upon request.

EXAMINATION OF PATHOLOGICAL TISSUE - - - $5.00

Accurate histological descriptions and diagnoses of tissues removed at operation should be part of the clinical record of all patients.

Sterile containers for the collection of all specimens sent gratis upon request.
Routine laboratory examinations made at reasonable prices. Send for fee list.

National Pathological Laboratories, Inc.

CHICAGO	ST. LOUIS	NEW YORK	BROOKLYN
5 South Wabash Avenue	*University Club Bldg.*	*18 East 41st Street*	*Chamber of Commerce Building*

Medication for Hypodermic Treatment

Sterile, Accurate, Efficient. In Hypule Form

Sodium Cacodylate, Mercury Biniodide, Mercury Salicylate, Iron Citrate, Iron Citrate and Sodium Arsenate, Emetine Hydrochloride, Fisher's Solution (concentrated), Gray Oil, Novocain and 80 other formulae.

Heister's Hypules

Heister's Hypule

These hypules not only insure full potency and exact dosage of the drug to be administered, but they afford the physician an asceptic, and readily assimilated solution or suspension. For treatment in serious and malignant diseases, hypodermic medication is far superior to the indirect methods of absorption through the alimentary tract. The use of **HEISTER'S HYPULES** places this form of medication on a scientific basis, relieving the practitioner of all anxiety as to the quantity or character of the hypodermic injection which he administers.

From the Laboratory of

LOUIS HEISTER

Manufacturers of Physician's Pharmaceutical Specialties in Hypule Form

List on Application **CINCINNATI, OHIO, U. S. A.**

ELECTRO-THERAPY IN THE ABSTRACT

Contents:

Diseases of the Nervous System.
Diseases of the Bones and Joints.
General Diseases.
Diseases of the Muscles.
Surgical Conditions.
Diseases of the Skin.
Diseases of the Respiratory System.
Diseases of the Alimentary System.
Diseases of the Eye, Ear and Nose.
Gynecology.
Andrology.
A Business Talk with Physicians,
Etc., Etc.

This valuable 140-page work mailed with our compliments to physicians requesting it on their letter head. No charge whatever.

THOMPSON PLASTER CO.,

Leesburg, Va.

THE RADIUM
COMPANY OF
COLORADO
INCORPORATED

PURE
RADIUM SALTS
IN ANY APPROVED
TYPE *of* APPLICATOR

U. S. BUREAU OF STANDARDS
CERTIFICATION OF RADIUM
CONTENT

SCIENTIFIC INSTALLATION
FURNISHED TO SEPARATE
EMANATION FROM RADIUM

CORRESPONDENCE INVITED BY OUR
PHYSICAL, CHEMICAL
and MEDICAL DEPT'S
Whose service is at your disposal at all times

THE
RADIUM COMPANY
OF COLORADO, INC.
DENVER
COLORADO
50 UNION SQUARE
NEW YORK

(Continued from page 44)

Dr. S. B. Maxey, Angleton, President; Dr. M. H. Eades Sweeney, Vice-President; Dr. G. G. Wyche, Angleton, Secretary-Treasurer.

New officers for Johnson County Medical Society are as follows: Dr. W. R. Washburn, President; Dr C. V. Ezell, Vice-President; Dr. W. E. Lucey, Secretary-Treasurer, all of Cleburne.

Deaths

Dr. F. K. Fisher, Galveston, aged 67, died February 11 from heart disease.

Dr. J. C. Brewer, Lytton Springs, aged 72, died February 3.

Dr. Alex Boyd, Yoakum, aged 54, died March 7.

Dr. P. L. Adams, Dawson, aged 77, died February 9.

Dr. C. N. Abbott, McKinney, aged 69, died February 20.

Dr. J. L. Gilbert, El Paso, aged 33, died February 20 from influenza.

Dr. H. A. Hardeman, Melrose, aged 60, died February 3.

Dr. J. R. Adams, Fort Worth, aged 97, died February 27.

Dr. S. W. Adams, Rockland, aged 53, died in a hos-

(Continued on page 48)

CLASSIFIED ADVERTISEMENTS

WANTED—Field Director Rural Sanitation in Southern State. Salary, $2,700 to $3,600 with $800.00 expense allowance. Address C. C., care JOURNAL.

APPLICATIONS are desired from physicians for desirable positions with a large corporation. Please state your age and college and the year graduated. Furnish small, inexpensive photograph if convenient. Applications will be considered strictly confidential. C. F. U., care JOURNAL.

FOR SALE—Small sanitarium, near Baltimore, Md., which has been successfully operated for 13 years. Endorsed and patronized by leading physicians of the city. Twelve acres, brick building, on R. R. Owner wishes to retire. Address S. G. L., care JOURNAL.

WANTED—Electric Light Bath Cabinet complete. Give size, make, age, condition and lowest price f. o. b. location. Also one photomicographic camera, make, condition and lowest price. Address P. S., care JOURNAL.

GUINEA PIGS—LABORATORY PURPOSES. I can furnish strong, healthy stock, in nice condition, at the following prices: 8 to 10 ounce, 85c; 10 to 12 ounce, $1.00; 12 to 14 ounce, $1.15; 14 to 16 ounce, $1.25; 16 to 18 ounce, $1.50, but shipment will require a week or ten days' time on account of heavy demand and shipments. Southern laboratories should keep thirty days' supply on hand. E. L. Harris, 1512 East Main St., Chattanooga, Tenn.

INTERNES WANTED—St. Joseph's Hospital (a three-hundred bed general hospital) needs two more internes, and would be glad to consider applications. Recent graduates preferred; state school graduated from and year of graduation. Compensation, board and lodging, and instruction. Term of service, one year. Apply to Dr. O. S. McCown, Bank of Commerce & Trust Building, Memphis, Tenn., President of Staff.

Reduce the "Tax on the Nerves!"

Originally, mankind walked on soft springy turf, or heavily carpeted floors. Today our sidewalks and floors are hard and unyielding. Every step with ordinary heels of leather means a harsh, sudden impact which jars the whole body. Multiplied thousands of times each day, this jarring is bound to impose a serious tax on the nervous system. But wearing

O'Sullivan's HEELS

provides just the cushion effect needed to prevent this jarring, with its essential depression and fatigue, and thus reduce the "tax on the nerves."

As a direct result, O'Sullivan's Heels not only prove a constant source of comfort and satisfaction, but also contribute substantially to the health and efficiency of the whole body.

O'SULLIVAN RUBBER CO., Inc., New York City

Marshall Field Annex Building
25 E. Washington St.,
Chicago, Ill.

ESTABLISHED 1904

Our names and reputations stand back of our work.

Chicago Laboratory

RALPH W. WEBSTER, M.D., Ph.D., Chemical Dept.
THOMAS L. DAGG, M.D., Pathological Dept.
C. CHURCHILL CROY, M.D., Bacteriological Dept.

FOR the protection of your patient use a laboratory whose personnel and equipment are beyond question.

Containers for collecting all specimens will be sent gratis upon request.

Write for Fee Table if you have not received one.

DOCTOR: Write or Wire

Ambulatory Pnuematic Splint Mfg. Co.

ATLAS BLOCK, CHICAGO

RESULTS COUNT **FRACTURES**

Hip, Thigh or Leg Set. Splints Rented Ready to Apply. Your Treatment of Patients, In or Out of Bed, Secures Good Bone Union, Comfort, Strength and Health in the Least Time with the Ambulatory Pneumatic Splint.

Specify it and our "Ambumatic" Washable Abdominal Supporters.

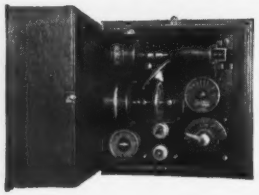
Adjustable for uplift or Binder, to any part of abdomen. Once used always prescribed.

Send for Order Blanks, Sample Materials, Literature, Prices, etc.

DOCTOR! In Justice to that Patient you should try the Slow Sinusoidal Current

The McIntosh No.8 Polysine Generator

"The Sine of Progress"



Generates Galvanic and Sinusoidal Currents in many variations. Eight different Modalities. Built for operation on alternating current, this apparatus is the latest development in the field of Electro Therapy. The first of these are just nearing completion.

SAFEST SUREST SIMPLEST

Its installation is a sure proof of your sagacity. Special literature and generous offer sent on request without any obligation to you. A complete line of X-Ray and treatment apparatus described in our 40th Edition Catalogue.

McINTOSH BATTERY & OPTICAL CO.

Main Office and Factory
217-223 No. Desplaines St.
Chicago, Illinois

Eastern Office and Service Station
1777 Broadway
New York, N. Y.

McIntosh Battery & Optical Co.,
Chicago, Ill.

Gentlemen:

Please send your special literature and full particulars with reference to the No. 8 Polysine Generator.

Name .....

Address .....

(Continued from page 46)

pital in Beaumont, February 16 from septic meningitis.

Dr. H. J. Palmer, Navasota, died March 6.

VIRGINIA

Officers elected for Wise County Medical Society are: Dr. J. A. Gilmer, Big Stone Gap, President; Drs. Charles C. Garr, Inman, David A. Dunkley, Tom's Creek, and Daniel M. Moore, Stonega, Vice-Presidents; Dr. C. B. Bowyer, Stonega, Secretary.

A gift of $60,000 to the Home and Retreat, at Lynchburg, was made by the family of the late James R. Gilliam as a memorial to Mr. Gilliam, for several years Chairman of the Board of Directors of the Hospital.

The opening and maintenance of the emergency influenza hospital in Danville during the recent epidemic cost the city slightly under $2,000, according to reports which have been made public.

Deaths

Dr. C. R. MacKimmie, Norfolk, aged 51, died February 12 from complications following influenza.

Dr. Wm. A. Deas, Richmond, aged 85, died in Williamsburg, February 17.

Dr. Frank Fletcher, Jenkins Bridge, aged 74, dropped dead at his home, February 25.

WEST VIRGINIA

Dr. H. G. Steele, Bluefield, has recently opened a new hospital known as the Mountain View Hospital.

Deaths

Dr. Elisha H. Coombs, Morgantown, aged 84, died February 19.

GENERAL

Dr. Houston L. Staring, formerly of Valmora, New Mexico, announces that beginning April 1 he will be associated with Dr. Leroy S. Peters on the staff of St. Joseph's Sanatorium, Albuquerque, New Mexico.

Getting Ahead

is the story of Peter Perkins and how he accumulated $10,000 in ten years by investing $25 per month in high-grade listed stocks and bonds on a novel plan. "Getting Ahead" is as interesting as anything you ever read.

Thousands have read it and are now "getting ahead" financially on the same plan. You will be fascinated with it. But better still, it will show you a new way to invest your savings monthly—how to get interest, plus a PROFIT, on your money—without sacrificing safety. We send it free. WRITE FOR IT TODAY.

KRIEBEL & CO.

INVESTMENT BANKERS

147H South La Salle St., Chicago

WHY PAY MORE?

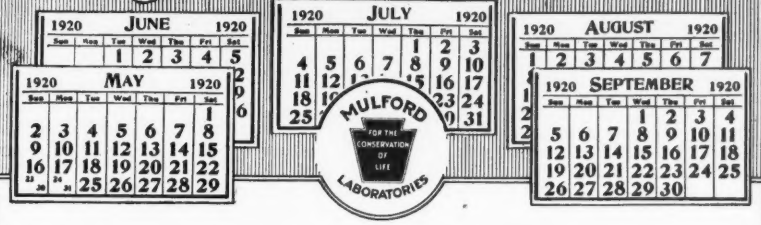
$20

When you can have this complete Pocket Mercurial Sphygmomanometer (Dr. Beachler Type) at the price of $20.00.

Gives you guaranteed mercurial accuracy with pocket size convenience. Registers both systolic and diastolic pressures up to 300 millimeters. Neat case, 2¾ x 2¾ x 12½. Easily carried. Always ready for use. Send check for $20.00 and outfit will be delivered to your office prepaid.

THE RELIABLE AND EFFICIENT MFG. CO.
1195 E. 124th St. Cleveland, Ohio

Hay Fever Time



For Spring Sufferers

Affected by the pollens of spring grasses, and subject to so-called "Rose Cold" or Spring Hay Fever, treatment is usually begun early—in April or May—at least four to six weeks before the expected attack.

Sheppegrell reports an analysis of 707 cases treated with pollen extract, of which 89% showed satisfactory results, 4% showed little or no improvement, and 7% discontinued treatment before the result could be noted. In no case was there an aggravation of symptoms. (Public Health Reports, Vol. 34, No. 31, 1919).

Mulford Hay Fever Pollen Extract
(Spring)

Contains proteins of the pollens of timothy, rye, orchard grass, sweet vernal grass and red top grass, accurately standardized in physiological salt solution.

It is furnished in convenient syringe and vial containers.

Immunize Early Against Hay Fever

H. K. MULFORD COMPANY, Philadelphia, U. S. A.

44244-m

Mulford

THE PIONEER BIOLOGICAL LABORATORIES

SELF-RISING.
MAKES PALATABLE BREAD-MUFFINS-PANCAKES ETC.
MADE ONLY BY
LISTER BROS. INC
405 LEXINGTON AVE.
NEW YORK CITY.

Listers
DIABETIC PREPARED CASEIN FLOUR

ACCEPTED BY THE COUNCIL.

100% NON-CARBOHYDRATE
ANALYSIS

Moisture	10.66%	Ash	1.63%
Protein	69.95%	Fat	0.67%
STARCH	0.00%	SUGAR	0.00%
Leavening and Flavoring	17.09%		

Descriptive Literature Upon Request

Price, with one general applicator
$30.00

TYPE D

Violet Ray High Frequency Generator

Here, Doctor—Violet Ray outfit of real merit. Thousands of them are being used daily by successful physicians throughout this and other countries. Especially indicated in the treatment of rheumatism, neuritis, lumbago and kindred conditions.

Order me today, doctor

THE SOUTHERN COIL ELECTRIC COMPANY
Corner Capitol and Fannin Streets HOUSTON, TEXAS

Enteroptosis Binder

BOLEN ABDOMINAL SUPPORTERS AND BINDERS
(PATENTED)

FOR MEN, WOMEN AND CHILDREN

We have a supporter for every purpose — Obesity, Hernias, Post-Operative, Ptosis, Sacro-Iliac, Pregnancy, etc.

Catalog on request.

BOLEN MFG. CO. 213 BAIRD BUILDING OMAHA, NEBRASKA

LOESER'S INTRAVENOUS SOLUTIONS

INTRAVENOUS MEDICATION

Is Destined to Revolutionize the Treatment of

MALARIA

The very evident increase in number and resistance of the red corpuscle, with subsidence of objective and subjective symptoms, makes the intravenous use of Iron and Arsenic the rational treatment of Malaria.

Recent observations indicate that the paroxysm is caused by hemolysis of the red corpuscle, rather than parental digestion of the plasmodium and marks the time when the resistance of the corpuscle is overcome by the attached plasmodium.

The red corpuscle is not only the site of the infection, but the most active agent in combatting the plasmodium.

Every study of Malaria indicates that the red cell destruction (anemia) and their recovery is a true index of the status of the infection.

The use of Iron and Arsenic is well justified by practice, but the intravenous method marks a new era in the treatment of Malaria.

Loeser's Intravenous Solution IRON and ARSENIC

Each ampoule, 5cc, contains 64 Mgs. (1) gr. of Iron Cacodylate. 6 ampoules.....per box $3.00

Loeser's Intravenous Solution QUININE DIHYDROCHLORIDE .5

Each ampoule, 5cc, contains .5 Gm. (7½ gr.) Quinine Dihydrochloride U.S.P. 6 ampoules in box $1.50

Complete list of Intravenous Solutions, reprints and clinical data furnished upon request.

NEW YORK INTRAVENOUS LABORATORY

110 EAST 23rd STREET **NEW YORK CITY**

To stabilize the alkaline reserve

in the acute infections (including influenza and pneumonia) large quantities of alkali are needed.

If their administration offers difficulty

PRESCRIBE KALAK WATER

Each bottle carries in sparkling form several grammes of the bicarbonates of sodium, potassium, calcium and magnesium.

Kalak Water Company of N.Y.
23 City Hall Place New York City

Illustration of "Automatic Closing" Tube No. 34
FRIES BROS., Manufacturers 92 Reade Street, New York

GENERAL ANAESTHESIA

With "Graduated Kelene" also as a preliminary to Ether
When Applied With Our
GLASS AUTOMATIC SPRAYING TUBES
does the work quickly, pleasantly and thoroughly
NO STEAM VALVE IS REQUIRED
Simply press the lever and the Automatic Sprayer does the rest
GLASS TUBES ALONE INSURE ABSOLUTE PURITY
Sole Distributors for the United States

MERCK & COMPANY, New York Rahway St. Louis

Measuring cap which double-seals the cork.

SOFOS

SOFOS is a product of the research laboratories of the General Chemical Company—one of the world's leading scientific organizations—a strictly American institution.

The Reason for "SOFOS"

—A New Preparation

The reason why sodium phosphate is not used more extensively lies not in its inability to exert the physiological action ascribed to it, but the failure to employ the ideal and therefore most active form.

The "reason why" of sodium phosphate success will be found in

SOFOS

Because SOFOS, a preparation of monosodium phosphate and sodium bicarbonate, has the same phosphate value as 1¾ times U. S. P. sodii phosphate.

Because SOFOS contains no citric or tartaric acid and after effervescence in water yields di-sodium phosphate *only*.

Because SOFOS is efficiently laxative or purgative according to dosage, without griping or "nagging."

Because SOFOS is pleasant and agreeable to the taste, adapted for children, old people, debilitated or delicate persons.

Because SOFOS is intended for professional use, and will be ethically introduced to the medical profession.

Because a test of the performance of SOFOS will fulfill and justify the promise of SOFOS.

SOFOS has been accepted by the Council on Pharmacy and Chemistry of the A. M. A. for inclusion in New and Non-official Remedies.

Ask your pharmacist for SOFOS. If he hasn't any, notify us.

Literature on request.

GENERAL CHEMICAL CO.
SPECIALTIES DEPARTMENT
NEW YORK

A House of Service

3—Manufacture of Therapeutic Agents

THE house of Parke, Davis & Company has specialized for 53 years in the manufacture of therapeutic agents. As in other fields of human endeavor, this period has been marked by continuous improvements in products and processes.

For instance, the first pepsin, made forty-six years ago, had a digestive power of 1:12; that is, one grain would digest twelve grains of coagulated albumin. Its potency was increased to 1:100 seven years later, and subsequently to 1:500.

Today this house is producing pepsin which has a digestive power of 1:10,000, or more than eight hundred times the potency of the original product and over three times the standard requirement of the United States Pharmacopœia.

The first diphtheria antitoxin made by Parke, Davis & Company, a little over a quarter of a century ago, contained an average of one thousand units to the dose.

Today, in the daily routine of the laboratory, diphtheria antitoxin is produced that makes it possible for physicians to administer ten thousand units or more in a single dose—an antitoxin that is approximately ten times as potent as that supplied twenty-five years ago.

Parke, Davis & Company were pioneers in the manufacture of glandular extracts, and their discoveries and improved methods have contributed materially to the development of the new science of endocrinology.

The suprarenal gland, for example, was used only to a limited extent in medicine until Adrenalin was made available to physicians. Likewise, the therapeutic value of the pituitary gland was unknown until this house gave to physicians a highly refined product, now recognized as the most potent oxytocic extant.

PARKE, DAVIS & COMPANY